Education and the Environment Initiative

Assembly Bill 1548 (Pavley, Chapter 665, Statutes of 2003)

Standards Alignment Maps

Kindergarten through Twelfth Grade

Science

and

History/Social Science

DRAFT — December 1, 2004

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Science

Standards Alignment Map

Kindergarten

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Kindergarten — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Physical Sciences 1. Properties of materials can be observed, measured, and predicted. As a basis for understanding this concept:		
a. Students know objects can be described in terms of the materials they are made of (e.g., clay, cloth, paper) and their physical properties (e.g., color, size, shape, weight, texture, flexibility, attraction to magnets, floating, sinking).	I a	• The properties of objects are determined by what they are made of. • People depend on raw materials that come from natural systems.
b. Students know water can be a liquid or a solid and can be made to change back and forth from one form to the other.		
c. Students know water left in an open container evaporates (goes into the air) but water in a closed container does not.		
Life Science 2. Different types of plants and animals inhabit the earth. As a basis for understanding this concept:		
a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).		
b. Students know stories sometimes give plants and animals attributes they do not really have.	V a b	• Stories that give plants and animals attributes provide erroneous or incomplete information causing students to make incorrect decisions or take incorrect actions. • Analyzing such stories can build students' personal decision-making skills.
c. Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).	I a b	• The major structures of common plants and animals allow them to live. • These structures differ based on the natural system where the plants and animals live or originated. • The health of plants and animals depends on the health of the natural system where they live. • The major structures of common plants and animals are consumed by humans and sustain our lives.
Earth Sciences 3. Earth is composed of land, air, and water. As a basis for understanding this concept:		
a. Students know characteristics of mountains, rivers, oceans, valleys, deserts, and local landforms.	I a b	• Different landforms support different natural systems.
b. Students know changes in weather occur from day to day and across seasons, affecting Earth and its inhabitants.		
c. Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.	I a b c; V a	• Goods produced by natural systems are essential to everyday human life and integral to our economies and cultures. Conservation practices affect the health of natural systems and thus the quality, quantity, and reliability of goods. • Decisions by individuals to use and/or conserve natural resources are based on a wide variety of considerations.

Investigation and Experimentation

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework)."*

Science

Standards Alignment Map

First Grade

DRAFT — December 1, 2004

First Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Physical Sciences 1. Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:		
a. Students know solids, liquids, and gases have different properties.	I a, III a	• Materials produced by natural systems can be observed in different forms including solids (e.g., soil, trees), liquids (e.g., water) and gases (e.g., oxygen, carbon dioxide). • The specific properties of these materials are used to classify the material. • Solid, liquid and gaseous materials produced by natural systems are essential to human life.
b. Students know the properties of substances can change when the substances are mixed, cooled, or heated.	I a b c	• The properties of substances can change when acted upon by humans through processes of mixing, cooling and heating, and can result in the creation of new substances.
Life Sciences 2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:		
a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.	I a b c; II a b c	• Natural environments provide the essential elements for survival for plants and animals. • Different types of environments provide for the essential needs of specific types of plants and animals. • Different animals and plants have different ways of surviving in their environments. If the environment changes, the plants and animals may have trouble surviving. • External features of plants and animals allow them to interact with one another and create healthy, fully functioning ecosystems that also can provide resources for humans. • Actions by humans often have an impact on the functioning and health of natural systems.
b. Students know both plants and animals need water, animals need food, and plants need light.	I a b c; II a b c; III a b c; IV a b c	• Plants and animals need resources that are produced by natural systems, (e.g., water, food and light). • Plants provide food for animals. People depend on plants for food. In order to stay healthy, people need to be able to grow healthy plants, and this requires healthy soil, adequate and clean water, and space.
c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.	I a b c; II a b c; III a b c; IV a b c	• Natural systems produce the plants and animals that are essential to the survival of animals. • Natural systems provide materials for shelter and nesting for animals. These materials may come from plants or animals. • Humans rely on the same natural resources for survival as plants and animals.
d. Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants).	II a b c	• If an animal's food is changed as the result of human activities, the animal cannot simply change its diet. (Pandas, for example, depend on the availability of certain kinds of bamboo. If the bamboo forest is altered, it will be difficult for pandas to survive.
e. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.	I a b; II a b; IV b	• Natural systems provide resources necessary for plants to survive. • Plants have particular structures (e.g. roots, leaves) that allow them to survive in certain environments. • Humans can have positive, negative, or neutral influences on plant systems, including roots and leaves. Examples include soil compaction, soil contamination, water quality and quantity, and effects brought about by use of fertilizers and chemicals.
Earth Sciences 3. Weather can be observed, measured, and described. As a basis for understanding this concept:		
a. Students know how to use simple tools (e. g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.	III a b	• Weather as a natural system proceeds through cycles and processes that are observable and measurable in nature. • Weather and climate have important influences on human societies and practices such as agriculture.

First Grade — California Science Standards

b. Students know that the weather changes from day to day but that trends in temperature of rain (or snow) tend to be predictable during a season.	I c; III a b V a	• Weather, weather trends, and seasonal change are a part of the cycles and processes essential to fully functioning natural systems. • Although we can predict trends, there is no guarantee that every winter will bring enough water or that every summer will bring enough heat for people to grow crops. Lack of moisture is called a drought. If the areas that grow our crops have droughts, people may not be able to grow enough food. • Conserving water in our daily activities can help make water available for our needs.
c. Students know the sun warms the land, air, and water.	I b; III a	• The sun's warming of the land, air, and water is an ecosystem service upon which humans and all other living things depend. • The sun's warming of the land, air, and water is a part of the cycles and processes essential to fully functioning natural systems. • Solar energy can be used in various ways, including space and water heating and electrical generation.

Investigation and Experimentation

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Science

Standards Alignment Map

Second Grade

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Second Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Physical Sciences 1. The motion of objects can be observed and measured. As a basis for understanding this concept:		
a. Students know the position of an object can be described by locating it in relation to another object or to the background.		
b. Students know an object's motion can be described by recording the change in position of the object over time.		
c. Students know the way to change how something is moving is by giving it a push or a pull. The size of the change is related to the strength, or the amount of force, of the push or pull.		
d. Students know tools and machines are used to apply pushes and pulls (forces) to make things move.		
e. Students know objects fall to the ground unless something holds them up.		
f. Students know magnets can be used to make some objects move without being touched.		
g. Students know sound is made by vibrating objects and can be described by its pitch and volume.		

Life Sciences 2. Plants and animals have predictable life cycles. As a basis for understanding this concept:		
a. Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.	I a b c; II b; III a b; V a	• Reproduction is essential to the survival of a species. • Plant and animal reproduction is important in providing resources necessary for human survival. • Maintaining reproductive cycles (plants and animals) is essential to maintain the health of ecosystems. • If we want to protect a species, we need to protect the existing individuals. We can't replace extinct species by breeding other species.
b. Students know the sequential stages of life cycles are different for different animals, such as butterflies, frogs, and mice.	I a b c; III a	• Reproductive cycles differ for different animals. • Different animals have different ecosystem requirements in order to maintain their reproductive cycles. • Natural systems must be healthy enough to sustain natural reproductive rates of animal species.
c. Students know many characteristics of an organism are inherited from the parents. Some characteristics are caused or influenced by the environment.	II a b c; III a c; IV a b	• Organisms inherit characteristics from their parents that are essential to their survival. • The quantity and toxicity of byproducts generated by human activities can affect the reproductive cycles and genetic characteristics of humans and other organisms.
d. Students know there is variation among individuals of one kind within a population.	I a c; III a	• Variation among individuals within a population increases the probability that the population will survive when there are changes in a natural system.
e. Students know light, gravity, touch, or environmental stress can affect the germination, growth, and development of plants.	II a b c; III a b c; IV a b c	• Natural systems provide the appropriate conditions necessary for the cycles and processes that facilitate the germination, growth and development of plants. • Natural changes in systems can cause conditions that may affect the germination, growth and development of plants. • Direct and indirect changes to natural systems that result from human activities (population growth, expansion of communities, production and consumption of natural resources) can create environmental stresses that affect the germination, growth and development of plants. • Maintaining plant reproductive cycles is necessary for the health of natural systems, and to the human practices that depend on those systems. • Changes to the environment can influence plant growth.

Second Grade — California Science Standards

f. Students know flowers and fruits are associated with reproduction in plants.	I a b; III a b c	• Natural systems provide the component parts (e.g., soil, nutrients, water) that are necessary for reproduction in plants, (e.g. flowers, fruits). • Reproduction in plants is an important function as it provides food sources, building materials and other resource materials for use by animal and humans. • Maintaining reproductive cycles is necessary for the health of natural systems and for the goods and services those systems provide and upon which humans depend. • Human activities can affect plant reproduction.

Earth Sciences 3. Earth is made of materials that have distinct properties and provide resources for human activities. As a basis for understanding this concept:		
a. Students know how to compare the physical properties of different kinds of rocks and know that rock is composed of different combinations of minerals.	I a b c	• Natural systems provide the rocks and minerals that comprise the earth's crust. • Rocks are composed of different combinations of minerals that provide resources (goods) for human activities. • Rocks are an important component of natural systems.
b. Students know smaller rocks come from the breakage and weathering of larger rocks.	II a; III a b c	• The process of physical and chemical weathering causes breakage of larger rocks into smaller rocks. • Weathering plays a major role in the cycling of matter through natural systems. • Human practices can cause breakage and weathering of rocks or alter the rates of these processes.
c. Students know that soil is made partly from weathered rock and partly from organic materials and that soils differ in their color, texture, capacity to retain water, and ability to support the growth of many kinds of plants.	I a b c; II a b c; III a b c	• Soil is a primary component of natural systems and is essential for plant growth. • Soil is made up partly from weathered rock and partly from organic materials. • Weathering and decomposition (the breakdown of organic matter) are natural system processes (ecosystem services) that play a major role in soil production. • Soils differ in their color, texture, and capacity to retain water and support plant growth. Some of these characteristics influence the type, quantity and quality of plant life that soil will support. • Soil is an essential component of healthy, fully functioning natural systems. • Soil formation and soil composition are essential components in the cycling of nutrients within and between natural systems and upon which humans depend. • Direct and indirect changes to natural systems that result from human activities (e.g., population growth, expansion of communities, production and consumption of natural resources) and the management of natural systems can affect the ability of soil to support the growth of plants. • Human activities can influence the health of soils.
d. Students know that fossils provide evidence about the plants and animals that lived long ago and that scientists learn about the past history of Earth by studying fossils.		
e. Students know rock, water, plants, and soil provide many resources, including food, fuel, and building materials, that humans use.	I a b c; II a b c d	• Rocks, water, plants and soil are natural system components. • Independently and as components of natural system processes, rocks, waters, soil and plants provide resources (goods) that humans depend upon and use. • These goods are influenced by the health and functioning of the natural systems that produce them. • Direct and indirect changes to natural systems that result from human activities (e.g., population growth, expansion of communities, production and consumption of natural resources and resource management) influence the viability of natural systems. • Many of the resources that humans use are finite and non-renewable. As human populations grow, there is increasing competition for these limited resources.

Investigation and Experimentation

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Science

Standards Alignment Map

Third Grade

DRAFT — December 1, 2004

Third Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Physical Sciences 1. Energy and matter have multiple forms and can be changed from one form to another. As a basis for understanding this concept:		
a. Students know energy comes from the Sun to Earth in the form of light.	I a b; III a b	• The Sun is the primary source of energy for Earth. It enables living things to grow. • The sun ultimately drives the cycles and processes required for natural systems to function. • Food, fuel, and energy are among the goods produced by natural systems that rely on the sun's energy.
b. Students know sources of stored energy take many forms, such as food, fuel, and batteries.	I a b c	• Food, fuel, batteries, and other forms of stored energy are goods that humans need. • The energy in our food comes from the sun. • The energy in fuels such as wood, coal, oil, and natural gas came from the sun. Wood supplies are renewed through the growth of forests. Coal, oil, and natural gas required thousands of years to be renewed. Therefore wood is a renewable resource and coal, oil, and natural gas are non-renewable resources. • The energy stored in batteries is generated from other energy sources. • The storage of energy is an ecosystem service upon which all living things depend. • The health of natural systems affects the quality, quantity, and reliability of stored energy.
c. Students know machines and living things convert stored energy to motion and heat.	I a b; II b; III a	• When energy is converted from one form to another, energy is lost to the environment, usually as heat. • Human production and consumption of natural resources can influence the ability to convert stored energy to motion and heat. • Natural systems require cycles to convert stored energy to motion and heat.
d. Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.	I b; III a b	• Energy transfer is an ecosystem service upon which humans depend. • Natural cycles and system processes depend on the flow of energy within and between natural and human systems.
e. Students know matter has three forms: solid, liquid, and gas.	I a; III a b	• The goods produced by natural systems and used by humans come in solid, liquid and gaseous forms. • Changes among these forms are directly related to natural cycles and system processes and result from the flow of energy.
f. Students know evaporation and melting are changes that occur when the objects are heated.		

Third Grade — California Science Standards

g. Students know that when two or more substances are combined, a new substance may be formed with properties that are different from those of the original materials.	I a b c; III a b c; IV a b c; V a	• The properties of new substances produced by combining two or more substances can result in new goods essential to human life and integral to our economies and cultures. Combining substances can be a natural ecosystem service or induced by humans. • The process of combining substances, such as through manufacturing activities, can affect the quality, quantity, and reliability of goods and services derived from natural systems. • Sometimes the properties of the new substance are desirable; sometimes they are harmful. • Some recycling processes can separate these substances, enabling them to be recovered for new uses. • Matter and energy flow in natural systems, combining substances, creating new ones, and breaking down old ones (like weathering of rocks). Human practices may depend upon these system processes and substances. Human activities can change the patterns of flow of energy and matter and the properties of resulting substances. • Human activities may introduce substances that combine with other substances in both intended and unintended ways. The byproducts of human activities can create combinations with other substances and change the properties of the original resource materials. These byproducts are not readily prevented from entering natural systems and may have beneficial, neutral or detrimental effects. • The ability of natural systems to adjust to the introduction of substances varies with the nature of the system and the nature and scope of the alterations. • Economics, environmental costs and benefits, public health implications, and personal views are among the considerations that influence decisions made regarding the introduction of substances into the environment.
h. Students know all matter is made of small particles called atoms, too small to see with the naked eye.		
i. Students know people once thought that earth, wind, fire, and water were the basic elements that made up all matter. Science experiments show that there are more than 100 different types of atoms, which are presented on the periodic table of the elements.		

2. Light has a source and travels in a direction. As a basis for understanding this concept:		
a. Students know sunlight can be blocked to create shadows.		
b. Students know light is reflected from mirrors and other surfaces.		
c. Students know the color of light striking an object affects the way the object is seen.		
d. Students know an object is seen when light traveling from the object enters the eye.		

Third Grade — California Science Standards

Life Sciences 3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:		
a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.	I a b; III a c	• Plants and animals have different structures that allow them to grow, survive, and reproduce or to use the goods produced within the ecosystem to meet their needs. These functions play important roles in the production of some of the goods and services essential to human life and integral to our economies and cultures. • Organisms have adaptations to help them survive in a given environment. If an environment changes either through human activity or natural occurrences, organisms may or may not have the adaptations that would enable them to survive. Organisms cannot simply adapt when environments change. • Growth, survival and reproduction of plants and animals are cycles and processes necessary for the functioning of natural systems. • These processes can be influenced by human activities.
b. Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.	I a b c; II a b c d	• Different environments produce different quantities and qualities of goods and ecosystem services, depending in part on the plants and animals that live there. The quality, quantity, and reliability of resources within a natural system are assured only when this composition of plants and animals is maintained. • Different kinds of organisms are adapted for living in different environments. If an environment changes either through human activity or natural occurrences, some of the organisms that live there may not survive. • The growth of human populations, expansion of human communities, natural resource production and consumption patterns, and laws and policies governing use of natural systems influence the geographic extent, composition, biological diversity, and viability of those systems.
c. Students know living things cause changes in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.	I a b c; II a b c d; III a c; IV a b c ; V a	• Natural systems produce goods and ecosystem services essential to human life. As environments change, whether by human activity or natural occurrences such as succession, the goods and ecosystem services those environments provide also change. • The growth of human populations, expansion of human communities, natural resource production and consumption patterns, and laws and policies governing use of natural systems influence the geographic extent, composition, biological diversity, and viability of those systems. • The health of natural systems depends on maintaining the natural cycles and system processes that operate within them. Human activities change the patterns of flow and natural cycles. • The quantity of resources used, the energy consumed, and the byproducts of human activities can affect the way natural systems function. Byproducts of human activities are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect. The capacity of natural systems to adjust to change varies with the nature of the system and the nature and scope of the alterations.

d. Students know when the environment changes, some plants and animals survive and reproduce; others die or move to new locations.	I a b c; II a b c d; III a c; IV a b c; V a	• Natural systems in any environment produce goods and services essential to human life. As environments change, whether by natural phenomenon such as succession or human-generated occurrence, the goods and services those environments produce also change. • The growth of human populations, expansion of human communities, natural resource production and consumption patterns, and laws and policies governing use of natural systems influence the geographic extent, composition, biological diversity, and viability of those systems. • Organisms that already have adaptations may survive in a given environment. If an environment changes, organisms may or may not have the adaptations that would enable it to survive. • The health of natural systems depends on maintaining natural cycles and system processes. Human activities change the patterns of flow and natural cycles. • The quantity of resources used, the energy consumed, and the byproducts of human activities impact the way natural systems function. Byproducts of human activities are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect. The capacity of natural systems to adjust to change varies with the nature of the system and the nature and scope of the alterations.
e. Students know that some kinds of organisms that once lived on Earth have completely disappeared…	I c; II a b c d; III a c; IV a c; V a b	• Extinction of species changes the quality, quantity and reliability of goods and services produced by natural systems. • The growth of human populations, expansion of human communities, and the natural resource production practices and consumption of humans cause changes in natural systems, including extinction of species. Laws, regulations, and policies governing the management of threatened and endangered species can prevent or delay extinction of species. • Natural systems proceed through cycles and processes that are required for their functioning. Extinction can occur in response to human activity or natural cataclysms. • Human activities such as energy consumption, use of goods, and generation of byproducts as a result of human activity can result in the extinction of species. • The ability of natural systems to adjust to change varies with the nature and scope of the alterations. In some cases, organisms that once lived on Earth have disappeared completely. Humans can adjust their practices to prevent extinction of species.

Earth Sciences 4. Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept:		
a. Students know the patterns of stars stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.		•
b. Students know the way in which the Moon's appearance changes during the four-week lunar cycle.		•
c. Students know telescopes magnify the appearance of some distant objects in the sky, including the Moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than the number that can be seen by the unaided eye.		•
d. Students know that Earth is one of several planets that orbit the Sun and that the Moon orbits Earth.		•
e. Students know the position of the Sun in the sky changes during the course of the day and from season to season.	III a	• The sun's differential warming of the land, air, and water is critical to many of the cycles and processes required for natural systems to function.

Investigation and Experimentation

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Science

Standards Alignment Map

Fourth Grade

DRAFT — December 1, 2004

Fourth Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Physical Sciences 1. Electricity and magnetism are related effects that have many useful applications in everyday life. As a basis for understanding this concept:		
a. Students know how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.		
b. Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.		
c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.		
d. Students know the role of electromagnets in the construction of electric motors, electric generators, and simple devices, such as doorbells and earphones.		
e. Students know electrically charged objects attract or repel each other.		
f. Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.		
g. Students know electrical energy can be converted to heat, light, and motion.		

Life Sciences 2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:		
a. Students know plants are the primary source of matter and energy entering most food chains.	I a b c; III a b c; IV a b c	• Plants are among the goods produced by natural systems upon which humans and other animals rely for food. Plants provide an ecosystem service by converting sunlight into a form that is usable by humans and other animals. • The health of natural systems affects the quality, quantity, and reliability of food chains. • Food chains and webs are among the natural cycles and processes essential to the function of natural systems. • The quantity and toxicity of waste and other byproducts introduced by humans into natural systems can be taken up by plant roots and thus enter food chains. The byproducts of human activity are not readily prevented from entering natural systems and may be detrimental to plant life. • In some cases, plants also play a role in the detoxification of waste and the cycling of nutrients —ecosystem services upon which humans depend.
b. Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.	I a b c; II a b c d; III a b c; IV a b c	• Producers (plants) are among the goods produced by natural systems upon which humans and other animals rely for food. Plants provide the service of converting sunlight into a form of energy (food) that is usable by humans and other animals. The health of natural systems affects the quality, quantity, and reliability of producers and consumers and the food chains and webs that connect them. • Food chains and webs are among the cycles and system processes required for natural systems to function. Many factors, including the human use of resources, can affect the competition for resources among other producers and consumers, altering the natural flow of energy and matter in natural systems. The byproducts produced by human activities can enter food chains and affect natural systems. • The capacity of natural systems to adjust to human alterations in food chains and webs varies with the nature of the system and the nature and scope of the alterations.

Fourth Grade — California Science Standards

c. Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.	I a b c; II a b c; III a b c; IV a b c	• Decaying plants and animals contain matter (nutrients) that can be counted among the goods produced by natural systems upon which humans and other animals rely for food. Decomposers provide ecosystem services by returning nutrients to the soil for further uptake by plants and enhancement of soil quality. • Decomposers play an essential role in the cycles and processes that comprise the food chains and webs required for natural systems to function. • Human practices can alter the flow of matter and energy in natural systems. • The byproducts produced by human activities can enter food chains and affect the natural systems. • The capacity of natural systems to adjust to human alterations in food chains and webs varies with the nature of the system and the scope of the alterations.

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:		
a. Students know ecosystems can be characterized by their living and nonliving components.	I a	• The living and nonliving components of an ecosystem and their interactions produce goods essential to human life and integral to our economies and cultures.
b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.	I c; II a b c d; III a c; IV a c	• The health of an ecosystem affects the ability of plants and animals to survive in any particular environment and therefore influences the quality, quantity, and reliability of the goods and ecosystem services that natural systems produce. • The cycling of energy and matter within natural systems affects the survival of plants and animals in any particular environment. Human activities can change the patterns of flow and natural cycles and make it more difficult for some kinds of plants and animals to survive. • The quantity and qualities of the matter, energy, and waste that flow between natural and human systems differ with the practices employed in various human activities. Human activities can make it more difficult for some kinds of plants and animals to survive. • The capacity of natural systems to adjust to human alterations varies with the nature and scope of the alterations. These alterations can make it more difficult for plants and animals in a particular environment to survive.
c. Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.	I a b c; II a b c d; III a c; IV a c	• Maintaining the interdependence of plants and animals is a vital component in the cycling of energy and matter within and between natural and human systems. Human activities can change the patterns of flow and natural cycles and make it more difficult for plants and animals to interact, survive, and reproduce. • The quantity and qualities of the matter, energy, and waste that flow within natural systems differ with the practices employed in various human activities. Human activities can make it more difficult for some kinds of plants and animals to interact, survive, and reproduce.
d. Students know that most microorganisms do not cause disease and that many are beneficial.	I a b c	• Microorganisms provide essential services within a natural system. • The ability of microorganisms to function effectively is directly affected by the health of the natural system.

Earth Sciences 4. The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:		
a. Students know how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).	I a; III a	• Different types of rocks (igneous, sedimentary, and metamorphic) have different properties and therefore produce different goods (such as soil type, minerals). Humans rely on different rocks for different uses. • The rock cycle is one of many cycles and processes essential to the maintenance of functioning natural systems.
b. Students know how to identify common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.		

5. Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:		
a. Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.	III a c	• Geologic processes such as erosion, landslides, volcanic eruptions, and earthquakes are among the cycles and processes required for natural systems to function. Human activities can magnify the impacts of some geologic processes, such as increasing the rate of erosion or landslide occurrence.
b. Students know natural processes, including freezing and thawing and the growth of roots, cause rocks to break down into smaller pieces.	1 a b; III a	• Soil and sediment are goods upon which humans depend. • Chemical and physical weathering result in the formation of soil and sediment, and can be considered an ecosystem service. • Processes such as freezing, thawing, and root growth are components of the rock cycle and are required for natural systems to function.
c. Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).	III a c, IV a	• The weathering, transport, and deposition of land by moving water are a part of the rock cycle and are required for natural systems to function. Human activities can affect the flow of water and therefore affect the natural erosion of landforms, and the weathering, transport, and deposition of pebbles, sand, silt, and mud.

Investigation and Experimentation

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework).*"

Science

Standards Alignment Map

Fifth Grade

DRAFT — December 1, 2004

Fifth Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Physical Sciences 1. Elements and their combinations account for all the varied types of matter in the world. As a basis for understanding this concept:		
a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.		
b. Students know all matter is made of atoms, which may combine to form molecules.		
c. Students know metals have properties in common, such as high electrical and thermal conductivity.	I a b	• The properties of metals contribute to their usefulness (goods and services) in natural systems and human societies.
d. Students know that each element is made of one kind of atom.		
e. Students know scientists have developed instruments that can create discrete images of atoms and molecules that show that the atoms and molecules often occur in well-ordered arrays.		
f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds.	I a	• Because we understand differences in chemical and physical properties of substances, we can separate mixtures to yield goods such as metals. • The physical properties of water, for example, enable it to evaporate at ambient temperatures and be separated from some other materials and compounds.
g. Students know properties of solid, liquid, and gaseous substances, such as sugar ($C_6H_{12}O_6$), water (H_2O), helium (He), oxygen (O_2), nitrogen (N_2), and carbon dioxide (CO_2).	I a b c	• Natural systems produce goods that come in solid, liquid and gaseous forms, and each have specific properties. • These goods and related ecosystem services are essential to human life. • The health of the system influences the quality, quantity, and reliability of substances. • Sugars are the basis of the food chains upon which we all depend. Only plants can make sugars; therefore, we are all dependent on a healthy food chain with a basis in green plants. • Water exists in solid, liquid, and gaseous states on Earth. The water cycle includes all three states. We are dependent on water and the water cycle. • Oxygen is produced by green plants through photosynthesis. We are dependent on green plants and healthy ecosystems for the production of oxygen. • Carbon dioxide is needed by green plants for photosynthesis, but too much can cause problems. In excess it is poisonous, and it also is a greenhouse gas that contributes to global climate change.
h. Students know living organisms and most materials are composed of just a few elements.		
i. Students know the common properties of salts, such as sodium chloride (NaCl)		

Life Sciences 2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:		
a. Students know many multicellular organisms have specialized structures to support the transport of materials.		
b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO_2) and oxygen (O_2) are exchanged in the lungs and tissues.		

Fifth Grade — California Science Standards

c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.		
d. Students know the role of the kidney in removing cellular waste from blood and converting it into urine, which is stored in the bladder.		
e. Students know how sugar, water, and minerals are transported in a vascular plant.		
f. Students know plants use carbon dioxide (CO_2 and energy from sunlight to build molecules of sugar and release oxygen.	I b; III a c	• Photosynthesis is an ecosystem service of natural systems upon which humans and other living organisms depend. • Photosynthesis is a component of many of the cycles and systems required for the functioning of natural systems. • Human practices can influence the photosynthetic processes.
g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO_2) and water (respiration).	I b; III a c	• Respiration is a service of natural systems upon which humans and other living components of natural systems depend. • Respiration is a component of many of the cycles and systems required for the functioning of natural systems. • Human practices can influence respiratory processes.

Earth Sciences

3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:

a. Students know most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.	I a c	• Water is an essential good produced by natural systems. The health of the system affects the quantity, quality, and reliability of water available for use by humans.
b. Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.	I b c; III a	• Evaporation, cooling, and freezing are ecosystem services provided by natural systems. Changes in evaporation, cooling, and freezing patterns—for instance in response to weather and climate changes—influence the quantity, quality, and reliability of goods and ecosystem services. • The processes of evaporation and freezing also cleanse water of many dissolved substances. • The water cycle is one of many cycles and processes required for the functioning of natural systems.
c. Students know water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.	I a b c; III a	• Clouds, fog and precipitation in its various forms are “goods,” and the ecosystem services they provide are produced by natural systems. • The health of natural systems may affect the water cycle that, in turn influences the quantity, quality, and reliability of precipitation. • The water cycle is a prime example of the flow of energy and matter within and between natural systems.

d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.	I a c; II a b c d; III a b c; IV a b c; V a	• Fresh water is a good produced by natural systems. The health of the natural system is determined in part by human practices related to water use and conservation; this in turn influences the quantity, quality, and reliability of fresh water resources. • The growth of human populations, the expansion of human communities, and natural resource production and consumption patterns affect the quality and quantity of available fresh water and thus the long-term functioning and health of ecosystems. The laws, regulations, policies, and incentives that govern the management of natural systems influence the quality and quantity of available fresh water, as well as its use, conservation, treatment, and reclamation. • The water cycle is one of many cycles and processes required for the functioning of natural and human systems. Human activities change the flow and cycling of water; conservation, treatment, reclamation, and recycling of water resources can extend the availability of water resources. • Human activities vary in their effects on freshwater systems and cycles; the effects depend on the quantity of resources used and the quantity and characteristics of the resulting byproducts. The byproducts of human activity are not readily prevented from entering natural systems. • The capacity of freshwater systems to adjust to human alterations varies with the nature and scope of the alterations. Water conservation, treatment, reclamation, recycling, and certain practices related to agriculture and forestry can lessen human impact on freshwater systems. • Economics, environmental costs and benefits, public health implications, and personal views are among the spectrum of considerations that influence the decisions regarding water resources.
e. Students know the origin of the water used by their local communities.	I a b c; II a b c d; III a b c; IV a b c; V a	• Every human community draws upon a particular natural system for its water needs. The health of the natural system influences the quantity, quality, and reliability of those fresh water supplies. • Watersheds, creeks, rivers, and aquifers yield a “good” upon which humans depend. • Aqueducts, dams, and reservoirs are human constructs that supply California’s communities with water. • Direct and indirect changes to natural systems that result from human population growth and expansion of communities can influence the quality and quantity of available fresh water and thus the plants and animals that depend on that water. • Human consumption of water resources also influences the viability of natural systems. Because water supply sources are not necessarily local, these changes do not have to be local in order to have an impact on a community’s water supply. • The laws, regulations, policies, and incentives that govern management of natural systems influence the quality and quantity of available fresh water, as well as its use, conservation, treatment, reclamation, and recycling. • The water cycle is one of many cycles and processes required for the functioning of natural and human systems. Human activities change the flow and cycling of water; conservation, reclamation, and recycling of water resources can extend the availability of water resources. • Human activities vary in their effects on freshwater systems and cycles; the effects depend on the quantity of resources used and the quantity and characteristics of the resulting byproducts. The byproducts of human activity are not readily prevented from entering natural systems. The capacity of freshwater systems to adjust to human alterations varies with the nature and scope of the alterations. • Economics, environmental costs and benefits, public health implications, and personal views are among the spectrum of considerations that influence the decisions regarding water resources.

4. Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept:		
a. Students know uneven heating of Earth causes air movements (convection currents).	I b; III a	• Air movements (currents) caused by the uneven heating of the Earth are among the ecosystem services provided by natural systems. • The heating of the Earth and the movement of air are components of many cycles and system processes that are required for the functioning of natural systems.
b. Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.	I b; III a b c	• The ocean influences the weather, thus providing an ecosystem service. • The water cycle and weather patterns are examples of cycles and processes required for the functioning of natural and human systems. • Human activities can alter the flow and cycling of water.
c. Students know the causes and effects of different types of severe weather.	I c; III a; IV a b	• Severe weather affects the reliability of goods and ecosystem services produced by natural systems. • When severe weather such as flooding or drought affects agricultural resources, the effects can be felt far away as food shortages. • Severe weather events influence the cycles and processes that are required for the functioning of natural systems. • Byproducts of human activity, including the release of greenhouse gases into the atmosphere, influence weather and climate that in turn may affect the health of natural systems.
d. Students know that weather forecasts depend on many variables.		
e. Students know that the Earth's atmosphere exerts a pressure that decreases with distance above Earth's surface and that at any point it exerts this pressure equally in all directions.		

5. The solar system consists of planets and other bodies that orbit the Sun in predictable paths. As a basis for understanding this concept:		
a. Students know the Sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.		
b. Students know the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects, such as asteroids and comets.		
c. Students know the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.		

Investigation and Experimentation

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework)."*

Science

Standards Alignment Map

Sixth Grade

DRAFT — December 1, 2004

Sixth Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Plate Tectonics and Earth's Structure 1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:		
a. Students know evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and mid-ocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.		
b. Students know Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.		
c. Students know lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.		
d. Students know that earthquakes are sudden motions along breaks in the crust called faults and that volcanoes and fissures are locations where magma reaches the surface.		
e. Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.		
f. Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.	III a b	• California's geology is defined by interactions within its natural systems. • Geologic cycles and processes are responsible for mountain building, volcanic activity, and the creation of faults. • Plate tectonics is key to understanding the general distribution of mountains, valleys, and faults, as well as mountain building and volcanic activity. • Humans are influenced by these geologic events and processes because they affect the distribution and type of California's natural systems, and therefore, the goods and ecosystem services upon which humans depend. • The distribution of mountains and valleys affects the flow of water and distribution of resources.
g. Students know that the effects of an earthquake on any region vary, depending on the size of the earthquake, the distance of the region from the epicenter, the local geology, and the type of construction in the region.		

Shaping Earth's Surface 2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment. As a basis for understanding this concept:		
a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.	I b; III a b	• Water running downhill is part of the natural process of shaping the landscape which in turn influences the functioning of natural systems. • Water movement is an ecosystem service that is essential to human cultures and economies.

b. Students know rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.	1 a b; III a b c	• Rivers and streams are dynamic natural systems that can erode, transport sediment and flood. • Erosion, transport of sediment, and flooding are natural cycles and processes that are essential to the function of natural systems. • Erosion, transport of sediment, and flooding can cause conditions that benefit or damage natural systems and human systems. • Some ecosystem services provided by rivers and streams, such as deposition of fertile sediment, are essential to human life and to the functioning of our economies and cultures. • Humans are influenced by these cycles and processes because they create landscapes that are suitable for human communities and conditions suitable for food production. They can also influence weather patterns and determine the goods and ecosystem services provided by natural systems for human use. • Humans can alter the flow of rivers and streams.
c. Students know beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.	I a b; III a b c	• Beaches are dynamic natural systems that are created and maintained as wave action distributes sediments from rivers along the coast in a continuous cycle. • The continuous cycles and processes involved in wave action and deposition of sediment are essential to the functioning of beach systems. • Humans are influenced by these cycles and processes because they in part determine the quantity and quality of goods and ecosystem services provided by coastal systems, for example, the distribution of organisms. • Sand and minerals deposited along beaches and, in rivers and streams, are goods that are important to humans and our economies and cultures. • Human activity can alter the flow of sediments along the coast and in the associated watershed. • Human development along coastlines is influenced by the dynamic activity of beaches.
d. Students know earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.	I a b; II b c d; III a b c; IV c	• Natural systems provide goods and ecosystem services that make human habitation possible. Some of the services provided by periodic geologic events, such as deposition of fertile sediment, are essential to human economies while others such as earthquakes, volcanic eruptions, landslides and floods can be destructive. • Earthquakes, volcanic eruptions, landslides, and floods release tremendous amounts of energy and move tremendous amounts of matter. • While geologic events are part of natural cycles and system processes required for natural systems to function, they are often destructive as they damage areas of human habitation and alter wildlife habitats. • Humans are influenced by these cycles and processes because they in part determine the goods and ecosystem services provided by natural systems for human use. • Human production and consumption of natural resources and the expansion of human communities can magnify the effects of earthquakes, volcanic eruptions, landslides and floods, and affect the integrity of natural systems. • Human practices can compound or lessen the impacts of earthquakes, volcanic eruptions, landslides, and floods on human communities and wildlife habitats.

Heat (Thermal Energy) (Physical Science) 3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:		
a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.		

b. Students know that when fuel is consumed, most of the energy released becomes heat energy.	I a; III a b c; IV a	• The consumption of fuel and resulting release of energy is an example of the cycles or processes required for natural systems to function. • When fuels are consumed, energy is released and various types of byproducts are produced. These byproducts can have positive, neutral or detrimental effects on the environment. • The energy released when fuel is consumed is mainly heat energy that moves through and can alter various natural systems. • Humans depend upon the flow of heat energy through natural systems. • Fuel is one of the goods produced by natural systems that is essential for the production of heat energy which is essential to human life and our economies and cultures. • Humans consume great quantities of fuel and in turn alter the cycles and processes that operate within natural systems. • The effects of human fuel consumption on natural systems are directly related to the quantities and qualities of fuel consumed.
c. Students know heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).		
d. Students know heat energy is also transferred between objects by radiation (radiation can travel through space).		

Energy in the Earth System 4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:		
a. Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.	I a b; III a b	• The sun is the major source of energy for phenomena on Earth's surface. • Natural system cycles and processes such as winds, ocean currents and the water cycle are driven directly or indirectly by the sun. • Heat and light from the sun are goods and ecosystem services that are essential to human life and our economies and cultures.
b. Students know solar energy reaches Earth through radiation.	III a b	• The Earth receives energy from the sun in the form of radiation as electromagnetic waves. • The process of energy transfer by radiation is essential to the functioning of natural systems. • The flow of energy within natural systems ultimately relies on the sun's energy reaching Earth. • Humans depend on radiation because it, in part, makes the Earth habitable and determines the goods and ecosystem services produced by natural systems upon which humans depend.
c. Students know heat from Earth's interior reaches the surface primarily through convection.	III a	• Geothermal energy can be harvested to generate electricity. There are environmental advantages and disadvantages to such use.
d. Students know convection currents distribute heat in the atmosphere and oceans.	1 b; III a b	• Most heat in the atmosphere and ocean systems moves by convection currents. • Convection currents are among the cycles and processes required for natural systems to function because these currents influence the distribution of heat in the atmosphere and oceans. • Humans depend on convection currents because they provide ecosystem services and the conditions for the production of goods for human use, e.g., the distribution of organisms. • Ocean currents along California's coasts are a major factor in determining what organisms live in the coastal oceans, as well as California's weather and climate.

Sixth Grade — California Science Standards

e. Students know differences in pressure, heat, air movement, and humidity result in changes of weather.	III a b c	• Differences in air pressure, heat, movement, and humidity influence weather patterns and drive the flow of energy and matter within natural systems. • Differences in air pressure, heat, movement, and humidity are the result of natural system cycles and processes. • Humans depend on these processes because they in part determine the goods and ecosystem services produced for human use. • Human practices can alter the processes operating within natural systems.

Ecology (Life Science) 5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:		
a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.	I b c; III a b	• Producers (plants) provide an ecosystem service by converting sunlight into chemical energy that is transferred to humans and other animals through consumption. • The health of natural systems affects the quality, quantity, and reliability of chemical energy. • Food chains and webs maintain the flow of energy within natural systems. These cycles and processes are required for natural systems to function. • All organisms, including humans, depend on the movement of this energy for their survival.
b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.	I a b c; II a b c d; III a b c; IV a b c	• All organisms (including humans) depend on the transfer of matter through food webs and between organisms and the physical environment. • Food chains and webs maintain the flow of matter within natural systems and are among the cycles and processes required for natural systems to function. • Humans depend on the transfer of matter from one organism to another and between organisms and the physical environment. • Human activities can change patterns of flow within food webs. • Waste and other byproducts generated by human systems may be introduced into food webs and may affect natural systems. If these byproducts are not prevented from readily entering natural systems, their effects can magnify as they are carried up the food chain. • The capacity of food webs to adjust to human alterations varies with the nature and scope of the alterations and the nature of the system. • The health of natural systems affects the quality, quantity, and reliability of the goods and ecosystem services associated with food webs.
c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem.	I b	• Populations of organisms can be categorized by the functions they serve in an ecosystem. • The functions served by some populations of organisms are essential to human life and integral to our economies and cultures.
d. Students know different kinds of organisms may play similar ecological roles in similar biomes.	I a b	• The environment, not the organism, defines ecological roles. • Different species in similar biomes in different geographic locations may play similar ecological roles. • Such roles yield goods and services that are essential to human life and our economies and cultures.

e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.	I a b c; II a b c d; III a b c; IV a b c	• The number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors. • Certain resources and abiotic factors, such as light and water, a range of temperatures, and soil composition must be present to ensure the survival of the organisms in an ecosystem. • Natural cycles and system processes govern the availability of resources (e.g., nutrients, water, soil) in a system and the abiotic factors that are required for the functioning of the system. • The available biotic and abiotic goods provided by natural systems are essential to human life and communities. If those systems are not healthy, they fail to produce the expected quantity and quality of resources. • Direct and indirect changes to natural systems that result from human activities (e.g., population growth, expansion of communities, production, consumption and management of natural resources) impact the ability of an ecosystem to support the variety and quantity of organisms necessary for the system to function effectively. • The byproducts of human activities affect natural systems. The capacity of natural systems to adjust to human-caused alterations in resource availability and abiotic factors depends on the scope, scale, and duration of the activity. • Laws, regulations, policies, and incentives that govern the management of natural resources can affect natural systems.

Resources 6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:		
a. Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.	I a; II a b c; III a b c; IV a b c; V a	• Energy sources are provided by natural systems. • Fossil fuels, which are non-renewable, are the main source of energy for most human activities in the United States. • Energy flow and transfer are processes required by natural systems in order to function. • The conversion of energy to useful forms results in direct and indirect changes to natural systems. • Sources of energy are essential to human life and integral to our economies and culture. • Humans depend on the flow on energy in natural systems, and on the ability to convert energy sources to useful forms. Humans can alter the energy cycles and processes that operate within natural systems in order to meet their energy needs. • The degree to which human use of energy resources affects natural systems depends on the quantity of energy consumed and the consequences of the process used to convert energy sources to useful form. • The byproducts of the conversion process are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect. • The capacity of natural systems to adjust to human alterations in energy resource availability and to the consequences of converting energy sources to useful forms varies with the nature of the system and the nature and scope of the alterations. • Economics, environmental costs and benefits, public health implications, and personal views are among the spectrum of considerations that influence decisions regarding energy production and consumption.

Sixth Grade — California Science Standards

b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.	I a b; II a b c d; III b c; IV c; V a	• Natural energy and material resources including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests are provided by natural systems. • Natural energy and material resources are classified as renewable or nonrenewable. • Energy and material resources provided by natural systems are essential to human life and integral to our economies and cultures. • Natural and human systems interactions can affect the availability and viability of energy and material resources. • Humans depend on the cycles and processes that enable natural systems to produce renewable and nonrenewable energy and material resources. Renewable resources cycle quickly and are replenished constantly. Nonrenewable resources flow through the system and are not replenished in a short enough period of time to have meaning for human use. • Human activities alter the patterns of flow and natural cycles and vary greatly depending on the practices employed in producing energy and materials for human use. • Use of even renewable resources has environmental consequences. • The capacity of natural systems to adjust to human alterations in energy and material resource availability varies with the nature of the system and the nature and scope of the alterations. • Human population growth, resource production methods and consumption rates, the operation and expansion of human communities and the laws, regulations, policies, and incentives governing the use and management of energy and material resources can all have an impact on the integrity of natural systems. • Decisions made by individuals, communities and society regarding energy and material production and consumption are based on a variety of factors—one of which may be knowledge of whether a resource is renewable or nonrenewable.
c. Students know the natural origin of the materials used to make common objects.	I a; II a b	• Most common objects are made with combinations of materials that have natural origins. • Natural systems provide materials necessary to produce goods (resources) that are essential to human life and integral to our economies and cultures. • Human resource production and consumption practices influence the geographic extent, composition, biological diversity, and viability of natural systems, and therefore the system's capacity to yield goods.

Investigation and Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

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Science

Standards Alignment Map

Seventh Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Cell Biology 1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept:		
a. Students know cells function similarly in all living organisms.		
b. Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.		
c. Students know the nucleus is the repository for genetic information in plant and animal cells.		
d. Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis.		
e. Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.		
f. Students know that as multicellular organisms develop, their cells differentiate.		

Genetics 2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept:		
a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.		
b. Students know sexual reproduction produces offspring that inherit half their genes from each parent.		
c. Students know an inherited trait can be determined by one or more genes.		
d. Students know plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive.		
e. Students know DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell.		

Evolution 3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:		
a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.	II a b c d; III a b c; IV a b	• Reproductive cycles and the flow of genetic material are required for the functioning of natural systems. Humans depend on these cycles and processes because they in part determine the goods and ecosystem services produced by natural systems. • Human activities (e.g., human population growth and expansion of communities, production and consumption of natural resources, the operation and expansion of human communities and the laws, regulations, policies, and incentives that govern management of natural systems) can influence the long-term functioning and health of natural systems. These impacts can include changing the natural course of inherited characteristics and thus, the evolution and diversity of species. • The byproducts of human activities can impact the reproductive cycles and genetic structure of species and thus affect the evolution and diversity of species. These byproducts are not readily prevented from entering natural systems and may have beneficial, neutral, or detrimental effects.
b. Students know the reasoning used by Charles Darwin in reaching his conclusion that natural selection is the mechanism of evolution.		
c. Students know how independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution.		
d. Students know how to construct a simple branching diagram to classify living groups of organisms by shared derived characteristics and how to expand the diagram to include fossil organisms.		
e. Students know that extinction of a species occurs when the environment changes and that the adaptive characteristics of a species are insufficient for its survival.	II a b c d; III a c; IV a c	• There are many different causes of extinction. Some of these are natural while others are human-induced. • Natural systems must proceed through processes and cycles to function. When these cycles and processes are altered or interrupted, whether by natural events or human actions, the environment changes. Throughout the history of life on Earth, some plants and animal species have died out completely in response to such environmental changes. • Human population growth and expansion of communities, production and consumption of natural resources, the operation and expansion of human communities, and the laws, regulations, policies, and incentives that govern management of natural systems can influence the long-term functioning and health of natural systems and rates of extinction. • The quantity and characteristics of the byproducts generated by human activities affect natural systems. The capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity, and on the nature and health of the natural system. In cases where the adaptive characteristics of a species are insufficient to respond to the degree of change, extinction can occur.

Earth and Life History (Earth Science) 4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept:		
a. Students know Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.	I a b; III a b c; V a b	• Geologic processes that occur in natural systems that are observed today are similar to those that occurred in the past. • The functioning of natural systems is dependent upon geologic processes that operate over long periods of time. The energy and material resources that regenerate on this time scale are available for human use in limited supplies. • Human activities can change the patterns of flow and diminish the quantity and quality of available goods and ecosystem services. • While human knowledge and ingenuity can affect or mitigate the effects of Earth processes, we cannot change the basic laws of nature. • Decisions regarding natural systems and resource use are based upon many factors, such as acknowledging limited knowledge about geologic processes and their effects over time.
b. Students know the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.		
c. Students know that the rock cycle includes the formation of new sediment and rocks, and that rocks are often found in layers, with the oldest generally on the bottom.	I a; III a b	• The formation of rocks and new sediment result from cycles and processes that occur in natural systems. • Sediments are goods produced by natural systems that are essential to human life and integral to our economies and cultures.
d. Students know that evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.		
e. Students know fossils provide evidence of how life and environmental conditions have changed.		
f. Students know how movements of Earth's continental and oceanic plates through time, with associated changes in climate and geographic connections, have affected the past and present distribution of organisms.		
g. Students know how to explain significant developments and extinctions of plant and animal life on the geologic time scale.	I c; III a b; IV a b c	• Natural systems can change gradually on a geologic time scale or rapidly. • Gradual or rapid changes to a natural system can influence its biogeochemical cycles, system processes, species composition, and capacity to yield goods and ecosystem services. • As a result of these changes, some plants and animal species die out and others may evolve. • Human activities and the resulting byproducts can influence natural systems in ways that cause equally significant developments and rapid changes to plant and animal life. • The capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts. • Environmental changes affect human populations just as they affect other organisms.

Structure and Function in Living Systems 5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept:		
a. Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.	IV a	• The components, processes, and cycles that occur in natural systems are analogous to the structures and functions that occur in whole organisms.
b. Students know organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.		
c. Students know how bones and muscles work together to provide a structural framework for movement.		
d. Students know how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy.		
e. Students know the function of the umbilicus and placenta during pregnancy.		
f. Students know the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.		
g. Students know how to relate the structures of the eye and ear to their functions.		

Physical Principles in Living Systems (Physical Science) 6. Physical principles underlie biological structures and functions. As a basis for understanding this concept:		
a. Students know visible light is a small band within a very broad electromagnetic spectrum.		
b. Students know that for an object to be seen, light emitted by or scattered from it must be detected by the eye.		
c. Students know light travels in straight lines if the medium it travels through does not change.		
d. Students know how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.		
e. Students know that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.		
f. Students know light can be reflected, refracted, transmitted, and absorbed by matter.		
g. Students know the angle of reflection of a light beam is equal to the angle of incidence.		
h. Students know how to compare joints in the body (wrist, shoulder, thigh) with structures used in machines and simple devices (hinge, ball-and-socket, and sliding joints).		

i. Students know how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system.		
j. Students know that contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system.		

Investigation and Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework).*"

Science

Standards Alignment Map

Eighth Grade

DRAFT — December 1, 2004

Eighth Grade — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Motion		
1. The velocity of an object is the rate of change of its position. As a basis for under-standing this concept:		
a. Students know position is defined in relation to some choice of a standard reference point and a set of reference directions.		
b. Students know that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.		
c. Students know how to solve problems involving distance, time, and average speed.		
d. Students know the velocity of an object must be described by specifying both the direction and the speed of the object.		
e. Students know changes in velocity may be due to changes in speed, direction, or both.		
f. Students know how to interpret graphs of position versus time and graphs of speed versus time for motion in a single direction.		
Forces		
2. Unbalanced forces cause changes in velocity. As a basis for understanding this concept:		
a. Students know a force has both direction and magnitude.		
b. Students know when an object is subject to two or more forces at once, the result is the cumulative effect of all the forces.		
c. Students know when the forces on an object are balanced, the motion of the object does not change.		
d. Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.		
e. Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).		
f. Students know the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.		
g. Students know the role of gravity in forming and maintaining the shapes of planets, stars, and the solar system.		
Structure of Matter		
3. Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements. As a basis for understanding this concept:		
a. Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.		
b. Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.		
c. Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers.		
d. Students know the states of matter (solid, liquid, gas) depend on molecular motion.		

e. Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.		
f. Students know how to use the periodic table to identify elements in simple compounds.		

Earth in the Solar System (Earth Science)		
4. The structure and composition of the universe can be learned from studying stars and galaxies and their evolution. As a basis for understanding this concept:		
a. Students know galaxies are clusters of billions of stars and may have different shapes.		
b. Students know that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.		
c. Students know how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.		
d. Students know that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.		
e. Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.		

Reactions		
5. Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. As a basis for understanding this concept:		
a. Students know reactant atoms and molecules interact to form products with different chemical properties.		
b. Students know the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.		
c. Students know chemical reactions usually liberate heat or absorb heat.		
d. Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction.		
e. Students know how to determine whether a solution is acidic, basic, or neutral.		

Chemistry of Living Systems (Life Science)		
6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:		
a. Students know that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.	I a b III a b	• Carbon's ability to combine with itself and other elements is essential to human life. • Carbon-based goods produced by natural systems and human practices such as agriculture are essential to human life. • The carbon cycle is an ecosystem service upon which all living things depend. • Carbon-based goods and the ecosystem services provided by natural systems are the basis of our economies and cultures.

Eighth Grade — California Science Standards

b. Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.	I a b III a b	• Matter that is comprised of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur is the essential component of all goods produced by natural systems and as such is the basis for human life. • Carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur are goods provided by natural systems. • These elements flow through natural systems in regular cycles. • The flow and cycling of these elements and others is integral to our economies and cultures.
c. Students know that living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA.		

Periodic Table

7. The organization of the periodic table is based on the properties of the elements and reflects the structure of atoms. As a basis for understanding this concept:

a. Students know how to identify regions corresponding to metals, nonmetals, and inert gases.		
b. Students know each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.		
c. Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.		

Density and Buoyancy

8. All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept:

a. Students know density is mass per unit volume.		
b. Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.		
c. Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced.		
d. Students know how to predict whether an object will float or sink.		

Investigation and Experimentation

9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."*

Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework).*"

Science

Standards Alignment Map

Earth Science Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Earth's Place in the Universe 1. Astronomy and planetary exploration reveal the solar system's structure, scale, and change over time. As a basis for understanding this concept:		
a. Students know how the differences and similarities among the sun, the terrestrial planets, and the gas planets may have been established during the formation of the solar system.		
b. Students know the evidence from Earth and moon rocks indicates that the solar system was formed from a nebular cloud of dust and gas approximately 4.6 billion years ago.		
c. Students know the evidence from geological studies of Earth and other planets suggest that the early Earth was very different from Earth today.		
d. Students know the evidence indicating that the planets are much closer to Earth than the stars are.		
e. Students know the Sun is a typical star and is powered by nuclear reactions, primarily the fusion of hydrogen to form helium.		
f. Students know the evidence for the dramatic effects that asteroid impacts have had in shaping the surface of planets and their moons and in mass extinctions of life on Earth		
g. * Students know the evidence for the existence of planets orbiting other stars		

2. Earth-based and space-based astronomy reveal the structure, scale, and changes in stars, galaxies, and the universe over time. As a basis for understanding this concept:		
a. Students know the solar system is located in an outer edge of the disc-shaped Milky Way galaxy, which spans 100,000 light years.		
b. Students know galaxies are made of billions of stars and comprise most of the visible mass of the universe.		
c. Students know the evidence indicating that all elements with an atomic number greater than that of lithium have been formed by nuclear fusion in stars.		
d. Students know that stars differ in their life cycles and that visual, radio, and X-ray telescopes may be used to collect data that reveal those differences.		
e. * Students know accelerators boost subatomic particles to energy levels that simulate conditions in the stars and in the early history of the universe before stars formed.		
f. * Students know the evidence indicating that the color, brightness, and evolution of a star are determined by a balance between gravitational collapse and nuclear fusion.		
g. * Students know how the red-shift from distant galaxies and the cosmic background radiation provide evidence for the "big bang" model that suggests that the universe has been expanding for 10 to 20 billion years.		

Dynamic Earth Processes 3. Plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on Earth's surface. As the basis for understanding this concept:		
a. Students know features of the ocean floor (magnetic patterns, age, and sea-floor topography) provide evidence of plate tectonics.		
b. Students know the principal structures that form at the three different kinds of plate boundaries.		
c. Students know how to explain the properties of rocks based on the physical and chemical conditions in which they formed, including plate tectonic processes.	I a b; III a b	• Different physical and chemical conditions (including plate tectonic processes) form different kinds of rocks, each with different properties of use to humans and our economies and cultures. • Plate tectonic processes and the rock cycle are among the cycles and processes operating within natural systems.
d. Students know why and how earthquakes occur and the scales used to measure their intensity and magnitude.		
e. Students know there are two kinds of volcanoes: one kind with violent eruptions producing steep slopes and the other kind with voluminous lava flows producing gentle slopes.		
f. * Students know the explanation for the location and properties of volcanoes that are due to hot spots and the explanation for those that are due to subduction.		

Energy in the Earth System 4. Energy enters the Earth system primarily as solar radiation and eventually escapes as heat. As a basis for understanding this concept:		
a. Students know the relative amount of incoming solar energy compared with Earth's internal energy and the energy used by society.	I a; II b; III a	• Solar energy and Earth's internal energy are goods provided by natural systems that are essential to human life. • More energy enters natural systems than is required by human society. The methods used to extract, harvest, transport, and consume energy resources influence the viability of natural systems. • Energy from the sun or from Earth's interior drives many of the processes and cycles that function within natural systems.
b. Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.	I a b; II b c; III a b c	• Solar energy is a good provided by natural systems essential to human life and to the functioning of our economies and cultures. • Reflection, absorption, and photosynthesis are ecosystem services essential to human life and to the functioning of our economies and cultures. For example, we depend on photosynthesis for our food, natural heating and cooling, and the dissipation of energy from the Earth that helps moderate temperature. • Natural resource production and consumption practices and the expansion of human communities influence the rate and magnitude of reflection, absorption, and photosynthesis. This in turn influences the long-term functioning and health of natural systems. • Reflection, absorption, and photosynthesis are processes and cycles that operate on incoming solar radiation and are required for natural systems to function. Humans depend on these cycles and processes because they in part determine the goods and ecosystem services produced by natural systems. • Human practices can alter the rate and magnitude of reflection, absorption, and photosynthesis on incoming solar radiation and thus influence the cycles and processes operating within natural systems.

c. Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.	I a b c; II a b c d; III a b c; IV a b c V a b	• Natural systems produce atmospheric gases that are essential to human life. • Atmospheric gases absorb the Earth's thermal radiation and provide other ecosystem services that are essential to human life. • The health of natural systems influences the quality, quantity, and reliability of atmospheric gases and the ecosystem services they provide. • The greenhouse effect may also alter natural systems in ways that affect human systems such as agricultural productivity and coastal developments (e.g., changing sea levels). • The rates and methods of human production and consumption of natural resources cause changes in the quantities of gases in the atmosphere, potentially leading to global climate change. This can influence the geographic extent, composition, biological diversity, and the viability of natural systems. • The operation and expansion of human communities and the laws, regulations, policies, and incentives that govern the release of substances into the atmosphere cause changes in the quantities of gases in the atmosphere and can contribute to the greenhouse effect. This can influence the geographic extent, composition, biological diversity, and the viability of natural systems. • The absorption of thermal radiation by atmospheric gases is a critical component in the cycles and processes that maintain the temperature and climate of natural systems. Humans depend on these cycles and processes for moderation of weather and climate. Human practices can increase the emission of greenhouse gases and alter the cycles and processes that control climate and temperature. • The effects of human activities due to the greenhouse effect are directly related to the quantities and characteristics of greenhouse gases released as byproducts of those activities. Those byproducts are not readily prevented from entering natural systems and can have beneficial, neutral, or detrimental effects. The capacity of natural systems to adjust to the introduction of human-caused greenhouse gases depends on the nature of the system and the scope, scale, and duration of the activities that produce these gases. • Decisions about resources and natural systems involve a spectrum of considerations. Knowledge about global climate change is incomplete and models used to predict its scope and impact may not be accurate. Assessment of the social, economic, political and environmental factors involved in decisions about atmospheric gases has changed over time.
d. * Students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climatic consequences of each.	IV a b c	• The differing greenhouse conditions on Earth, Mars, and Venus can inform our understanding of the climatic consequences of changing concentrations of atmospheric gases. The effects of adding some substances to the atmosphere as a result of human activities may influence the global climate, which affects the long-term functioning of both natural and human social systems. • The byproducts of human activity are not readily prevented from entering the atmosphere and may be beneficial, neutral, or detrimental in their effects. • The capacity of the atmosphere to adjust to human-caused alterations varies with the nature and scope of the alterations and with the conditions of the atmosphere itself, as evidenced by comparing the greenhouse conditions of Earth, Mars, and Venus.

5. Heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. As a basis for understanding this concept:		
a. Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.	II b; III a b c	• The global distribution of heat influences the goods and ecosystem services provided by natural systems and thereby influences the viability of human communities and natural systems. • The concentration of human activities in cities produces heat as a byproduct, which can affect circulation patterns in the atmosphere and the oceans, and influence the viability of human communities and natural systems. • Differential heating of the Earth results in circulation patterns in the atmosphere and ocean that govern the distribution of heat energy within and between natural systems. Humans depend on these energy cycles and processes because they in part determine climate and weather patterns.
b. Students know the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.	I b; III a b	• The circular motion of ocean currents and air in pressure centers influences the distribution of nutrients and organisms, thus influencing the goods and ecosystem services provided by coastal and marine systems. • The rotation of Earth results in circulation patterns in the atmosphere and ocean that govern the flow of energy within and between natural systems. • Fluctuations in climate and weather conditions that result from the rotation of Earth and the circular motions of ocean currents affect ocean temperature, thereby changing the distribution of organisms. Humans depend upon these organisms (e.g., fish and algae) for their sustenance and economies.
c. Students know the origin and effects of temperature inversions.	I c; IV a b c; V a	• Convection of air masses normally disperses gases and particulate matter in the atmospheric layers closest to the Earth's surface. • When inversions occur, convection is disrupted, causing these gases and particulate matter to be trapped close to the Earth's surface. • Inversions can thus affect the quality of the air humans and other organisms breathe. • Gases and particulate matter that are the byproducts of human activity are not readily prevented from entering natural systems. These gases and particulate matter may be detrimental, neutral or beneficial in effect. • The vulnerability of an area to temperature inversions is one of the factors considered when making policy and management decisions about managing the release of gases and particulate matter as byproducts of human activity.
d. Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.	I a b c; II a b c d; III a b c; IV a b c	• Properties of ocean water affect the geographic distribution of marine organisms and thus determine the goods and ecosystem services produced by coastal and marine systems. • The quantity, quality, and reliability of those goods and services depend on fully functioning coastal and marine systems. • The growth of human populations and their consumption rates influence the health of coastal and marine systems. • Human practices can alter cycles and processes in coastal and marine systems that influence the properties of ocean water and, in turn, may affect coastal, marine, freshwater and terrestrial organisms. • Human consumption of resources and the resulting byproducts affect the long-term functioning of coastal and marine systems.
e. Students know rain forests and deserts on Earth are distributed in bands at specific latitudes.	I a b c; II a b c d; III a b c; IV a c; V a	• Human practices influence the geographic extent and viability of rain forest and desert ecosystems. • The growth of human populations and their consumption rates influence the geographic extent and viability of rain forest and desert ecosystems. • Human practices can alter cycles and processes in rain forest and desert ecosystems. • Human consumption of resources and the resulting byproducts affect the long-term functioning of rain forest and desert ecosystems. • Decisions regarding the practices that affect rain forest and desert ecosystems are based on a spectrum of factors.

f. * Students know the interaction of wind patterns, ocean currents, and mountain ranges results in the global pattern of latitudinal bands of rain forests and deserts.		
g. * Students know features of the ENSO (El Niño southern oscillation) cycle in terms of sea-surface and air temperature variations across the Pacific and some climatic results of this cycle.	I a b; II b c d; III a b	• Sea-surface and air temperature variations result in phenomena such as ENSO, which influence the cycles and processes that sustain organisms in coastal and marine systems. • The oscillations between El Niño and La Niña currents fundamentally change weather across the ocean and bring on droughts and floods. These processes can be influenced by the global scale of human activity and effects such as climate change. • Global warming may reduce the ocean's ability to act as a carbon-dioxide sink. • Phenomena such as ENSO directly influence the reliability of the goods and ecosystem services produced by coastal and marine systems and thus affect the viability of human communities and societies.

6. Climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:		
a. Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.	I a b; III a b	• Weather and climate are central to the flow of energy and matter within and between natural systems. • Weather and climate are instrumental in the production of goods and ecosystem services by natural systems.
b. Students know the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.		
c. Students know how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.	II a b c d; III c; IV b c	• In addition to these factors, the growth of human populations and their consumption rates may now be influencing the Earth's climate. • In addition to naturally occurring climate change, human activities have resulted in the generation of byproducts that also contribute to climate change over time. • People, and the crops upon which we depend, have evolved in the climate that we have today.
d. * Students know how computer models are used to predict the effects of the increase in greenhouse gases on climate for the planet as a whole and for specific regions.	II a b c; V a b	• Models used to predict the effects of the increase in greenhouse gases on climate are among the spectrum of factors considered in making decisions about resources and natural systems. Policy makers do not necessarily agree about the significance of the greenhouse gases on climate change, which influences related decisions. Assessment of the social, economic, political and environmental factors involved in decisions about greenhouse gases has changed over time. • Quantities and distribution of global greenhouse gases may be influenced by direct and indirect changes to natural systems that result from human population growth, resource production and consumption, operation and expansion of communities, and the laws, regulations, policies, and incentives that govern management of natural resources. • Effects on the climates of specific regions can influence the geographic extent, composition, biological diversity, and viability of natural systems in those regions.
Biogeochemical Cycles 7. Each element on Earth moves among reservoirs, which exist in the solid earth, in oceans, in the atmosphere, and within and among organisms as part of biogeochemical cycles. As a basis for understanding this concept:		
a. Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle.	I b; III a b c	• Photosynthesis, respiration, and nitrogen fixing are services provided by natural systems and essential to human life. • The carbon cycle and the nitrogen cycle are central to the flow of energy and matter within and between natural systems. • Humans depend on the cycling of carbon and nitrogen. These cycles produce goods and ecosystem services essential to our lives, economies, and cultures. • Human practices can alter the carbon and nitrogen cycles.

b. Students know the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.	I a ; II b; III a b c; IV a b c ; V a	• Carbon is a good used in varying physical and chemical forms by natural systems. • Carbon is essential to all living organisms and to the functioning of human economies and cultures. • Natural resource production and consumption practices influence the global carbon cycle and affect the geographic extent, composition, biological diversity, and viability of natural systems. • The movement of carbon among its various reservoirs (atmosphere, oceans, biomass, coal and oil deposits, and the atmosphere) is central to the flow of energy and matter within and between natural systems. • Humans depend on the global carbon cycle and the different physical and chemical forms of carbon that move through the cycle. • Human practices can bring about changes in the carbon cycle. • Increased atmospheric carbon dioxide is a byproduct of the burning of fossil fuel that is not readily prevented from entering natural systems. The effects of increased carbon dioxide may be beneficial, neutral, or detrimental. • The capacity of natural systems to adjust to human-caused alterations in the global carbon cycle varies with the nature and scope of the alterations. • Decisions regarding the global carbon cycle are complex and based on a wide spectrum of considerations. Economics, environmental costs and benefits, public health, incomplete scientific knowledge, and personal views are among the factors that influence decisions regarding the cycling of the different physical and chemical forms of carbon.
c. Students know the movement of matter among reservoirs is driven by Earth's internal and external sources of energy.		
d. * Students know the relative residence times and flow characteristics of carbon in and out of its different reservoirs.	I a; II b; III a b c; IV a b c	• Human practices can alter the relative residence times and flow characteristics of carbon in and out of its different reservoirs (e.g., oceans, biomass, coal and oil deposits, and the atmosphere). • The quantity of resources (e.g., coal, oil) consumed by human activities affects the residence times of carbon in and out of its different reservoirs. • Natural resource production and consumption practices influence the global carbon cycle and affect the geographic extent, composition, biological diversity, and viability of natural systems. • Humans use carbon in varying forms and depend on its flow in and out of different reservoirs.

Structure and Composition of the Atmosphere 8. Life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life. As a basis for understanding this concept:		
a. Students know the thermal structure and chemical composition of the atmosphere.	I a b; II a b	• The thermal structure and chemical composition of the atmosphere influence human health. • The atmosphere and its components are essential to human life. • Human activities and practices influence the thermal structure and chemical composition of the atmosphere.
b. Students know how the composition of Earth's atmosphere has evolved over geologic time and know the effect of outgassing, the variations of carbon dioxide concentration, and the origin of atmospheric oxygen.	II a b c d; V a b	• In addition to these factors, the growth of human populations and their consumption rates may now be influencing the composition of Earth's atmosphere. • Decisions affecting human practices and activities regarding the composition of Earth's atmosphere are based on available knowledge, legal and economic factors and a variety of other considerations.

c. Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.	I a b c; II b; IV a b c; V a b	• Ozone is a good produced by natural systems and, in the upper atmosphere, it provides an ecosystem service that is essential to human life and health. • Natural resource production and consumption practices by human social systems influence the ozone layer and thereby influence the geographic extent, composition, biological diversity, and viability of natural systems. • The byproducts of current and past human practices and products (e.g., refrigeration, air conditioning, aerosol propellants, fire extinguishers, and cleaning and protection of electronic equipment) influence ozone in the upper atmosphere. These byproducts are not readily prevented from entering the atmosphere and are considered by many scientists to have detrimental effects. • The capacity of natural systems to adjust to human-caused ozone layer depletion depends on the nature of the system and the scope, scale, and duration of the activity. • Decisions about natural systems and resource use are complex and based on a spectrum of factors. Incomplete knowledge of the effects of ozone layer depletion influence decisions about ozone layer management. Policy makers do not agree about the significance of the depletion of the ozone layer, which influences related decisions. Assessment of the social, economic, political and environmental factors involved in decisions about ozone layer depletion has changed over time. • While policy makers may not agree about the significance of the depletion of the ozone layer, the consequences that may be resulting from the depletion may be detrimental to humans and natural systems.

California Geology

9. The geology of California underlies the state's wealth of natural resources as well as its natural hazards. As a basis for understanding this concept:

a. Students know the resources of major economic importance in California and their relation to California's geology.	I a b; II a b c d; IV a b c; V a b	• California's geology directly or indirectly provides resources of major economic importance to the state and its residents. • Mineral resources are finite and non-renewable. Recycling is important in making resources available to future generations. • Students need to know that methods used to extract, harvest, transport and consume geological resources influence the geographic extent, composition, biological diversity, and viability of natural systems. • Decisions regarding natural systems and resource use are complex and based on a spectrum of considerations including the economic value and environmental sustainability of available resources.
b. Students know the principal natural hazards in different California regions and the geologic basis of those hazards.	III a b; V a b	• California's natural systems proceed through cycles and processes including erosion, faulting and other seismic events. • The existence of geological hazards throughout California influences decisions about a variety of human practices including the expansion and operation of human communities and use of resources. • As populations increase, there is increasing pressure to build in geologically hazardous areas. While modern building techniques can help reduce risks, the magnitude and force of potential earthquakes are such that even the best built buildings could not withstand them.

c. Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.	I a b c; II a b c d; III c; IV a b c; V a b	• Water is a good that provides many ecosystem services essential to human life and integral to our economies and cultures. • We obtain water from various sources, including surface water, reservoirs, and aquifers. • Direct and indirect changes to natural systems due to the growth of human populations and communities influence the quality, quantity, and availability of fresh water supplies and thus affect the geographic extent, composition, biological diversity, and viability of natural systems. • Natural resource production and consumption practices influence the quality, quantity, and availability of fresh water supplies and thus affect the geographic extent, composition, biological diversity, and viability of natural systems. • The laws, regulations, policies, and incentives that govern our fresh water supplies influence the geographic extent, composition, biological diversity, and viability of natural systems. • The effects of human activities on California's fresh water systems are related to the quantities of water used and the quantity and characteristics of the byproducts of those activities. • Human practices can alter the cycles and processes that sustain California's fresh water systems and significantly affect local and regional water supply and demand. • The byproducts of human activities are not readily prevented from entering water systems and may be beneficial, neutral, or detrimental in their effects (e.g., potential contamination or shortages of water). • The capacity of natural systems to adjust to human-caused alterations in water quality and quantity depends on the scope, scale, and duration of human activities and the nature of their byproducts. Human alterations to the water supplies can affect the relationship between supply and need. • Decisions regarding use and distribution of surface water and groundwater are complex and based on a wide spectrum of considerations. Economics, environmental costs and benefits, public health, historical and cultural implications, and personal views are among the factors that influence the decisions made regarding California's fresh water resources. • While water is a resource that is recycled through natural and human systems, the amount of usable water is limited. As human population increases, there is increasing competition for available water.
d. * Students know how to analyze published geologic hazard maps of California and know how to use the map's information to identify evidence of geologic events of the past and predict geologic changes in the future.	V a b	• Evidence of past geologic events and the ability to predict geologic changes based on geological hazard maps are among the factors that might be considered in decisions regarding a variety of human practices including the expansion and operation of human communities and other resource use. • Decisions have changed as assessments of social, economic, political, and environmental factors have changed over time.

Science

Standards Alignment Map

Biology/Life Science Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Cell Biology 1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. As a basis for understanding this concept:		
a. Students know cells are enclosed within semi-permeable membranes that regulate their interaction with their surroundings.		
b. Students know enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.		
c. Students know how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure.		
d. Students know the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm.		
e. Students know the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.		
f. Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.		
g. Students know the role of the mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.		
h. Students know most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.		
i. Students know how chemiosmotic gradients in the mitochondria and chloroplast store energy for ATP production.		
j. Students know how eukaryotic cells are given shape and internal organization by a cytoskeleton or cell wall or both.		

Genetics 2. Mutation and sexual reproduction lead to genetic variation in a population. As a basis for understanding this concept:		
a. Students know meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.		
b. Students know only certain cells in a multicellular organism undergo meiosis.		
c. Students know how random chromosome segregation explains the probability that a particular allele will be in a gamete.		
d. Students know new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).		

e. Students know why approximately half of an individual's DNA sequence comes from each parent.		
f. Students know the role of chromosomes in determining an individual's sex.		
g. Students know how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents.		

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:		
a. Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive).		
b. Students know the genetic basis for Mendel's laws of segregation and independent assortment.		
c. * Students know how to predict the probable mode of inheritance from a pedigree diagram showing phenotypes.		
d. * Students know how to use data on frequency of recombination at meiosis to estimate genetic distances between loci and to interpret genetic maps of chromosomes.		

4. Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. As a basis for understanding this concept:		
a. Students know the general pathway by which ribosomes synthesize proteins, using tRNAs to translate genetic information in mRNA.		
b. Students know how to apply the genetic coding rules to predict the sequence of amino acids from a sequence of codons in RNA		
c. Students know how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein.		
d. Students know specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the genes themselves.		
e. Students know proteins can differ from one another in the number and sequence of amino acids.		
f. * Students know why proteins having different amino acid sequences typically have different shapes and chemical properties		

5. The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells. As a basis for understanding this concept:		
a. Students know the general structures and functions of DNA, RNA, and protein.		
b. Students know how to apply base-pairing rules to explain precise copying of DNA during semi-conservative replication and transcription of information from DNA into mRNA.	II b c; IV b	• Changes to the natural system, whether caused by natural events or human actions, can cause imprecise copying of DNA and result in new mutations being generated in the gene pool.

c. Students know how genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products.	I a b c; II b; III a b c; IV a b; V a b	• Genetic goods and processes (ecosystem services) provided by natural systems are essential to human life and communities. If those systems are not healthy, they can fail to produce the expected quantity and quality of resources. • The production of genetically engineered biomedical and agricultural products influences the composition, biological diversity, and viability of natural systems. • The transfer of genetic material is among the processes and cycles that natural systems must proceed through in order to function. Humans depend upon these processes and cycles as they in part determine the goods and ecosystem services natural systems provide. • By introducing new products, genetic engineering can alter the processes and cycles operating within natural systems and influence the health of the systems themselves. • The effects of genetic engineering on natural systems are directly related to the quantities and characteristics of the resulting byproducts. These byproducts are not readily prevented from entering natural systems and may have beneficial, neutral or detrimental effects. • Decisions regarding the introduction of genetically engineered products and use of biotechnology are complex and based on a wide variety of considerations, including economics, environmental costs and benefits, public health, historical and cultural implications, and personal views. Incomplete knowledge about the effects of biotechnology may influence decisions made about natural systems and resources.
d. * Students know how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, ligation, and transformation) is used to construct recombinant DNA molecules.		
e. * Students know how exogenous DNA can be inserted into bacterial cells to alter their genetic makeup and support expression of new protein products.		

Ecology 6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:		
a. Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.	I a b c; II a b c d; IV a b c d; V a b	• Human lives, communities and societies depend on the goods and ecosystem services produced by the sum total of the different kinds of organisms that comprise different ecosystems. • Direct and indirect changes to natural systems that result from human population growth, resource production and consumption, operation and expansion of communities, and the laws, regulations, policies, and incentives that govern management of natural resources affect habitats and can influence biological diversity. • The degree to which human activities affect biodiversity is directly related to the quantities of resources consumed and the quantity and characteristics of the byproducts of those activities. • These byproducts are not readily prevented from entering natural systems; their effects may be beneficial, neutral or detrimental, and they may be felt outside of the natural system in which they are introduced. The capacity of natural systems to adjust to human-caused alterations depends on the nature of the system, in some cases its biodiversity, as well as the scope, scale, and duration of the activity and the nature of its byproducts. • Decisions that may influence biodiversity in natural systems are complex and based on a spectrum of considerations that may include knowledge of biodiversity, economics, environmental costs and benefits, public health, historical and cultural implications, and personal views. • Our knowledge of the interactions among the parts of ecosystems is incomplete.

b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.	II a b c d; III b c; IV a b c; V a b	• Direct and indirect changes to ecosystems that are initiated by human population growth, operation and expansion of human communities, production and consumption of natural resources, and laws, regulations, policies, and incentives that govern management of natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems. • Humans depend upon the cycles that operate within natural systems. • Human practices can alter these cycles and bring about changes in an ecosystem. • The degree to which human activities affect ecosystems is directly related to the quantities of resources consumed and the quantity and characteristics of the byproducts of those activities. These byproducts are not readily prevented from entering natural systems; their effects may be beneficial, neutral or detrimental, and they may be felt outside of the natural system in which they are introduced. The capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity and the nature of its byproducts. • Decisions regarding natural systems and resource use are based on many factors—knowledge about ecosystem changes resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size are among them. As analysis of ecosystem changes provides deeper understanding of the impacts of human activities on natural systems, the assessment of social, economic, political, and environmental factors may change over time. • Decisions regarding natural systems and resource use are based on many factors—knowledge about ecosystem changes resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size are among them. As analysis of ecosystem changes provides deeper understanding of the impacts of human activities on natural systems, the assessment of social, economic, political, and environmental factors may change over time. • Since human activities can have significant and lasting influence on natural systems, it is important to base decisions on as much knowledge as possible. This knowledge should include an understanding of the influence of human activities on natural systems and an ability to assess social, economic, political, and environmental factors.
c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.	II a b c d; III a b c	• Direct and indirect changes to natural systems that result from human population growth and operation and expansion of communities may influence population size within ecosystems and influence the composition and viability of natural systems. • Human production and consumption of natural resources may cause fluctuations in population size within ecosystems and influence the composition and viability of natural systems. • The laws, regulations, policies, and incentives that govern management of natural systems may cause fluctuations in population size within ecosystems and influence the composition and viability of natural systems. • Reproductive and life cycles are among the cycles and processes that natural systems must proceed through in order to function. • Fluctuations in population size in an ecosystem in part determine the goods and ecosystem services provided by that natural system for human use. Human practices can alter these cycles and influence the health of natural systems. • The population of humans is determined by the same factors that determine the populations of other organisms. While humans may be able to affect those factors, ultimately the same natural laws apply.

d. Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.	I a b c; III a b c; IV a b c	• Water, carbon, nitrogen, and oxygen are recycled in chemical compounds by natural systems and are essential to human life. The cycling of these substances between abiotic resources and organic matter is an essential ecosystem service and is dependent upon the health of the ecosystem. • Exchange of matter occurs between organisms and abiotic systems on the cellular level. • Natural systems must proceed through processes and cycles to function (e.g., water, carbon, nitrogen cycles, photosynthesis respiration). • Humans depend upon the cycles and processes and can alter them cycles, thereby influencing the health of natural systems. • Human consumption of natural resources and the resulting generation of byproducts directly affect the long-tern functioning of natural systems.
e. Students know a vital part of an ecosystem is the stability of its producers and decomposers.	I a b c; II a b c d; III a b c	• Producers and decomposers produce goods and ecosystem services that are essential to all organisms, including humans. If the natural systems providing the producers and decomposers are not healthy, they will fail to produce the expected quantity and quality of resources. • Direct and indirect changes to natural systems that result from human population growth, operation and expansion of communities, production and consumption of natural resources, and laws, regulations, policies, and incentives that govern management of natural resources may influence the stability of producers and decomposers within a natural system. • In order to function, natural systems must proceed through processes and cycles that transfer energy and matter through producers, consumers, and decomposers. Humans depend upon these energy and matter cycles and processes because they in part determine the goods and ecosystem services provided by natural systems. Human practices can alter these cycles and influence the stability of producers and decomposers within an ecosystem.
f. Students know at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.	I a b c; III a b c; IV a	• Food webs, and the related transfer of energy and matter, are among the cycles and processes that natural systems must proceed through in order to function. Humans depend upon food web cycles because they in part sustain the natural systems and determine the goods and ecosystem services the systems provide for human use. • Human practices can alter food webs and influence the health of natural systems. • When a link in a food chain is eliminated, it influences the interactions among organisms and the availability of resources.
g. * Students know how to distinguish between the accommodation of an individual organism to its environment and the gradual adaptation of a lineage of organisms through genetic change.	II a b c d	• The ability of an organism to survive in its environment is dependent on its genetically determined capabilities. Individual organisms cannot simply decide to adapt or change their genetic makeup in order to survive.

Evolution 7. The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time. As a basis for understanding this concept:		
a. Students know why natural selection acts on the phenotype rather than the genotype of an organism.	II a b c d	• The ability of an organism to survive in its environment is dependent on its genetically determined capabilities. Individual organisms cannot simply decide to adapt or change their genetic makeup in order to survive.
b. Students know why alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool.		

c. Students know new mutations are constantly being generated in a gene pool.	I a b c; II a b c; IV a b c	• Genetic resources are essential to human life and communities. • Human practices can alter and instigate genetic mutations and influence the health of natural systems. • The effects of human activities on the rates of genetic mutation are directly related to the quantity and characteristics of the resulting byproducts. • These byproducts are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect. In some case, depending on the scope, scale, and duration of byproduct exposure, byproducts can lead to genetic mutations.
d. Students know variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.	I c; II a b c d; III c; IV a b; V a	• Changed environmental conditions, whether human-caused or natural, influence variation with species and thus the health of natural systems. This in turn affects the quality, quantity, and reliability of the goods and ecosystem services provided by those systems. • Direct and indirect changes to natural systems that result from human population growth, operation and expansion of communities, resource production and consumption, and laws and policies that govern resource management may influence population size and biological diversity. This in turn may influence variability within a species, thereby changing the likelihood that at least some members of a species will survive under changed environmental conditions. • Human practices can alter the cycles and processes within natural systems that sustain variation within species. These changes influence the likelihood that a species will survive under changed environmental conditions. • Decisions regarding natural systems and resource use are based upon many factors, among them knowledge about genetic variation and its implications.
e. * Students know the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature.		
f. * Students know how to solve the Hardy-Weinberg equation to predict the frequency of genotypes in a population, given the frequency of phenotypes.		

8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:		
a. Students know how natural selection determines the differential survival of groups of organisms.	II a b c	• The growth of human populations and consumption rates; methods used extract, harvest, transport and consume natural resources; and, the expansion and operation of human communities influence the environmental factors that result in natural selection and the differential survival of groups of organisms. • When people select organisms with desired traits, and then grow those organisms in a monoculture, there is a risk of an environmental change drastically affecting the survival of the monoculture crop.
b. Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.	II a b c	• The growth of human populations and consumption rates; methods used extract, harvest, transport and consume natural resources; and, the expansion and operation of human communities influence the composition, biological diversity, and viability of natural systems. • Therefore, if species diversity is decreased, the likelihood that organisms will survive major changes in the environment also decreases.
c. Students know the effects of genetic drift on the diversity of organisms in a population.		
d. Students know reproductive or geographic isolation affects speciation.	II a b c	• Geographic isolation of populations of organisms can be influenced by the growth of human populations and consumption rates; methods used extract, harvest, transport and consume natural resources; and, the expansion and operation of human communities. • People have introduced exotic species into ecosystems with devastating effects on the natural (endemic) populations. This is especially true on islands, such as Hawaii and Guam.
e. Students know how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction.		

f. * Students know how to use comparative embryology, DNA or protein sequence comparisons, and other independent sources of data to create a branching diagram (cladogram) that shows probable evolutionary relationships.		
g. * Students know how several independent molecular clocks, calibrated against each other and combined with evidence from the fossil record, can help to estimate how long ago various groups of organisms diverged evolutionarily from one another.		

Physiology		
9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. As a basis for understanding this concept:		
a. Students know how the complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.		
b. Students know how the nervous system mediates communication between different parts of the body and the body's interactions with the environment.		
c. Students know how feedback loops in the nervous and endocrine systems regulate conditions in the body.		
d. Students know the functions of the nervous system and the role of neurons in transmitting electrochemical impulses.		
e. Students know the roles of sensory neurons, interneurons, and motor neurons in sensation, thought, and response		
f. * Students know the individual functions and sites of secretion of digestive enzymes (amylases, proteases, nucleases, lipases), stomach acid, and bile salts.		
g. * Students know the homeostatic role of the kidneys in the removal of nitrogenous wastes and the role of the liver in blood detoxification and glucose balance.		
h. * Students know the cellular and molecular basis of muscle contraction, including the roles of actin, myosin, Ca^{+2}, and ATP.		
g. * Students know how hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.		

10. Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:		
a. Students know the role of the skin in providing nonspecific defenses against infection.		
b. Students know the role of antibodies in the body's response to infection.		
c. Students know how vaccination protects an individual from infectious diseases.		
d. Students know there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.		

e. Students know why a person with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign.		
f. * Students know the roles of phagocytes, B-lymphocytes, and T-lymphocytes in the immune system.		

Science

Standards Alignment Map

Chemistry

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Atomic and Molecular Structure 1. The periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure. As a basis for understanding this concept:		
a. Students know how to relate the position of an element in the periodic table to its atomic number and atomic mass.		
b. Students know how to use the periodic table to identify metals, semimetals, non-metals, and halogens.		
c. Students know how to use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends in ionization energy, electronegativity, and the relative sizes of ions and atoms.		
d. Students know how to use the periodic table to determine the number of electrons available for bonding.		
e. Students know the nucleus of the atom is much smaller than the atom yet contains most of its mass.		
f. * Students know how to use the periodic table to identify the lanthanide, actinide, and transactinide elements and know that the transuranium elements were synthesized and identified in laboratory experiments through the use of nuclear accelerators.		
g. * Students know how to relate the position of an element in the periodic table to its quantum electron configuration and to its reactivity with other elements in the table.		
h. * Students know the experimental basis for Thomson's discovery of the electron, Rutherford's nuclear atom, Millikan's oil drop experiment, and Einstein's explanation of the photoelectric effect.		
i. * Students know the experimental basis for the development of the quantum theory of atomic structure and the historical importance of the Bohr model of the atom.		
j. * Students know that spectral lines are the result of transitions of electrons between energy levels and that these lines correspond to photons with a frequency related to the energy spacing between levels by using Planck's relationship (E = hv).		

Chemical Bonds 2. Biological, chemical, and physical properties of matter result from the ability of atoms to form bonds from electrostatic forces between electrons and protons and between atoms and molecules. As a basis for understanding this concept:		
a. Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.		
b. Students know chemical bonds between atoms in molecules such as H_2, CH_4, NH_3, H_2CCH_2, N_2, Cl_2, and many large biological molecules are covalent.		
c. Students know salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction.		

d. Students know that atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular forces are too weak to hold the atoms or molecules in a solid form.		
e. Students know how to draw Lewis dot structures.		
f. * Students know how to predict the shape of simple molecules and their polarity from Lewis dot structures.		
g. * Students know how electronegativity and ionization energy relate to bond formation.		
h. * Students know how to identify solids and liquids held together by Van der Waals forces or hydrogen bonding and relate these forces to volatility and boiling/melting point temperatures.		

Conservation of Matter and Stoichiometry 3. The conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants. As a basis for understanding this concept:		
a. Students know how to describe chemical reactions by writing balanced equations.		
b. Students know the quantity one mole is set by defining one mole of carbon 12 atoms to have a mass of exactly 12 grams.		
c. Students know one mole equals 6.02×10^{23} particles (atoms or molecules).		
d. Students know how to determine the molar mass of a molecule from its chemical formula and a table of atomic masses and how to convert the mass of a molecular substance to moles, number of particles, or volume of gas at standard temperature and pressure.		
e. Students know how to calculate the masses of reactants and products in a chemical reaction from the mass of one of the reactants or products and the relevant atomic masses.		
f. * Students know how to calculate percent yield in a chemical reaction.		
g. * Students know how to identify reactions that involve oxidation and reduction and how to balance oxidation-reduction reactions.		

Gases and Their Properties 4. The kinetic molecular theory describes the motion of atoms and molecules and explains the properties of gases. As a basis for understanding this concept:		
a. Students know the random motion of molecules and their collisions with a surface create the observable pressure on that surface.		
b. Students know the random motion of molecules explains the diffusion of gases.		
c. Students know how to apply the gas laws to relations between the pressure, temperature, and volume of any amount of an ideal gas or any mixture of ideal gases.		
d. Students know the values and meanings of standard temperature and pressure (STP).		
e. Students know how to convert between the Celsius and Kelvin temperature scales.		
f. Students know there is no temperature lower than 0 Kelvin.		

g. * Students know the kinetic theory of gases relates the absolute temperature of a gas to the average kinetic energy of its molecules or atoms.		
h. * Students know how to solve problems by using the ideal gas law in the form PV = nRT.		
i. * Students know how to apply Dalton's law of partial pressures to describe the composition of gases and Graham's law to predict diffusion of gases.		

Acids and Bases 5. Acids, bases, and salts are three classes of compounds that form ions in water solutions. As a basis for understanding this concept:		
a. Students know the observable properties of acids, bases, and salt solutions.	I a b c; IV a b c	• Acids, bases, and salt solutions are goods provided by natural systems. The specific properties of these materials can be observed and categorized. • Humans use acids, bases, and salt solutions. • Human activities such as the burning of fossil fuels have resulted in increased acidity in the precipitation in some areas. This influences the health of natural systems, which in turn affects the reliability of goods and ecosystem services. • Human activities generate byproducts that contribute to the formation of sulfuric and nitric acids in the atmosphere. The effects of these activities are related to the quantities of resources consumed and the quantity and characteristics of the resulting byproducts. • Byproducts in the forms of acids, bases, and salt solutions are not readily prevented from entering natural systems and may be detrimental in their effects. • The capacity of natural systems to adjust to chemical changes depends on the nature of the system and the scope, scale, and duration of the human-caused exposure.
b. Students know acids are hydrogen-ion-donating and bases are hydrogen-ion-accepting substances.		
c. Students know strong acids and bases fully dissociate and weak acids and bases partially dissociate.	IV b c; V a	• The quantity and characteristics of the acids and bases that are the byproducts of human activities affect the health and viability of natural systems. • These byproducts are not readily prevented from entering natural systems and having beneficial, neutral or detrimental effects. • The ability to measure pH and the implications of those measurements are among the factors that can be considered in making decisions about resources and natural systems.
d. Students know how to use the pH scale to characterize acid and base solutions.		
e. * Students know the Arrhenius, Bronsted-Lowry, and Lewis acid-base definitions.		
f. * Students know how to calculate pH from the hydrogen-ion concentration.		
g. * Students know buffers stabilize pH in acid-base reactions.	I a b; III a b; IV a b	• Since buffers stabilize pH during acid-base reactions, they provide an ecosystem service that is essential to human life. • Many of the cycles and processes that operate within natural systems depend on buffers to stabilize pH in acid-base reactions. • The byproducts of human activities are not readily prevented from entering natural systems and having beneficial, neutral or detrimental effects. • The use of buffers stabilize pH in acid-base reactions can be a useful process for mitigating the effects of human practices used to extract, harvest, transport and consume natural resources.

Solutions		
6. Solutions are homogenous mixtures of two or more substances. As a basis for understanding this concept:		
a. Students know the definitions of solute and solvent.	I a b; II b; III a b; IV a b	• Based on knowledge of solutes and solvents, humans extract, harvest, transport and consume natural resources. • The dissolving process is a component in many of the cycles and processes that operate within natural systems. Human practices often depend on the cycles and processes that require dissolving. • Human activities generate byproducts that may dissolve in solutions within natural systems. The effects of these activities are directly related to the quantities of resources consumed and the quantity and characteristics of the byproducts. • Those byproducts are not readily prevented from entering natural systems and may be beneficial, neutral or detrimental in their effect.
b. Students know how to describe the dissolving process at the molecular level by using the concept of random molecular motion.		
c. Students know temperature, pressure, and surface area affect the dissolving process.	II a, b; III c; IV a	• Direct and indirect changes to temperature, pressure and surface area that result from human methods of resource production and consumption affect the dissolving process within natural systems and thereby influence the viability of those systems.
d. Students know how to calculate the concentration of a solute in terms of grams per liter, molarity, parts per million, and percent composition.		
e. * Students know the relationship between the molality of a solute in a solution and the solution's depressed freezing point or elevated boiling point.		
f. * Students know how molecules in a solution are separated or purified by the methods of chromatography and distillation.		
Chemical Thermodynamics		
7. Energy is exchanged or transformed in all chemical reactions and physical changes of matter. As a basis for understanding this concept:		
a. Students know how to describe temperature and heat flow in terms of the motion of molecules (or atoms).		
b. Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.		
c. Students know energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts.		
d. Students know how to solve problems involving heat flow and temperature changes, using known values of specific heat and latent heat of phase change.		
e. * Students know how to apply Hess's law to calculate enthalpy change in a reaction.		
f. * Students know how to use the Gibbs free energy equation to determine whether a reaction would be spontaneous.		

Reaction Rates 8. Chemical reaction rates depend on factors that influence the frequency of collision of reactant molecules. As a basis for understanding this concept:		
a. Students know the rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time.	I a b; II b; III a c; IV a b c	• Chemical reactions in natural systems create many of the goods and ecosystem services produced by those systems. • Natural resource production practices and consumption by humans can affect factors such as concentration, temperature, and pressure and influence the rate of chemical reactions within natural systems. • Factors such as concentration, temperature, and pressure within natural systems govern the reaction rates of chemical processes and cycles operating within natural systems. Human activities can impact these factors and alter the reaction rates. • Natural resource production and consumption practices and the quantity and characteristics of the byproducts can introduce catalytic agents and affect reaction rates within natural systems. • The quantity and characteristics of the byproducts of human activities govern the effect of those activities on natural systems. Some byproducts may serve at chemical catalysts and influence the rates of chemical reactions within natural systems. These byproducts are not readily prevented from entering natural systems and may have beneficial, neutral, or detrimental effects. • A natural system's capacity to adjust to human-caused changes in reaction rates varies with the nature and scope of the alterations. • By increasing reaction rates in chemical reactions within natural systems, catalysts provide an ecosystem service essential to human life. • Human practices can introduce chemical catalysts into natural systems that alter the normal reaction rates of cycles and processes operating within natural systems. • Activation energy plays an essential role in chemical reactions within natural systems. Activation energy is essential to human life. • Activation energy is essential to achieve the chemical reactions that drive many of the processes and cycles operating within natural systems. • The byproducts of human activities can include increasing energy such that activation of chemical reactions occurs. These reactions may be beneficial, neutral, or detrimental in effect.
b. Students know how reaction rates depend on such factors as concentration, temperature, and pressure.		
c. Students know the role a catalyst plays in increasing the reaction rate.	II b c; IV a b c	• Human methods of resource production and consumption may result in the release of chemicals into natural systems. • These chemicals may either act as catalysts for chemical reactions in a natural system or may influence the effects of naturally occurring catalysts. • Catalysts, for example, play a role in the production of photochemical smog.
d. * Students know the definition and role of activation energy in a chemical reaction.		

Chemical Equilibrium 9. Chemical equilibrium is a dynamic process at the molecular level. As a basis for understanding this concept:		
a. Students know how to use LeChatelier's principle to predict the effect of changes in concentration, temperature, and pressure.	II b; III a b c; IV a b; V a	• Natural resource production and consumption practices by humans can cause changes in concentration, temperature, and pressure that affect chemical processes in natural systems in predictable ways. These changes can influence the integrity of natural systems. • Dynamic processes operating within natural system seek chemical equilibrium in response to stresses such as changes in concentration, temperature and pressure. Human activities can alter the factors (concentration, temperature, pressure) that influence chemical equilibrium and affect the cycles and processes operating within natural systems. • The effects of human activities on chemical equilibrium are directly related to the quantity and characteristics of byproducts that bring about changes in concentration, temperature, and pressure in chemical reactions. These byproducts are not readily prevented from entering natural systems and may have beneficial, neutral, or detrimental effects.
b. Students know equilibrium is established when forward and reverse reaction rates are equal.		
c. * Students know how to write and calculate an equilibrium constant expression for a reaction.		

Organic Chemistry and Biochemistry 10. The bonding characteristics of carbon allow the formation of many different organic molecules of varied sizes, shapes, and chemical properties and provide the biochemical basis of life. As a basis for understanding this concept:		
a. Students know large molecules (polymers), such as proteins, nucleic acids, and starch, are formed by repetitive combinations of simple subunits.	II a b c; IV a b c	• Human methods of resource production and consumption may result in the release of large molecules (polymers) into natural systems. • These large molecules (polymers) are often long-lasting and may not readily breakdown in a natural system.
b. Students know the bonding characteristics of carbon that result in the formation of a large variety of structures ranging from simple hydrocarbons to complex polymers and biological molecules.	I a b, III a b c	• Carbon is a good produced by natural systems that is the basis for the chemical reactions that sustain life and a part of many ecosystem services. • The various forms of carbon are essential to human life and integral to our economies and cultures.
c. Students know amino acids are the building blocks of proteins.	I a	• Amino acids are essential to human life and integral to our economies and cultures.
d. * Students know the system for naming the ten simplest linear hydrocarbons and isomers that contain single bonds, simple hydrocarbons with double and triple bonds, and simple molecules that contain a benzene ring.		
e. * Students know how to identify the functional groups that form the basis of alcohols, ketones, ethers, amines, esters, aldehydes, and organic acids.		
f. * Students know the R-group structure of amino acids and know how they combine to form the polypeptide backbone structure of proteins.		

Nuclear Processes 11. Nuclear processes are those in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear fusion. As a basis for understanding this concept:		
a. Students know protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons.		

b. Students know the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chemical reactions. The change in mass (calculated by E = mc2) is small but significant in nuclear reactions.		
c. Students know some naturally occurring isotopes of elements are radioactive, as are isotopes formed in nuclear reactions.	II a b c	• Human methods of resource production and consumption may result in the release of radioactive isotopes into natural systems. • These radioactive isotopes are often long-lasting and may not readily breakdown in a natural system. • Radioactive isotopes can influence the geographic extent, composition, biological diversity, and viability of natural systems.
d. Students know the three most common forms of radioactive decay (alpha, beta, and gamma) and know how the nucleus changes in each type of decay.		•
e. Students know alpha, beta, and gamma radiation produce different amounts and kinds of damage in matter and have different penetrations.	IV a b c	• The byproducts of human activity may include radioactive isotopes that are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect depending upon the nature of the radiation (e.g., alpha, beta, and gamma). • Natural systems have a limited capacity to adjust to human-caused releases of radioactive elements.
f. * Students know how to calculate the amount of a radioactive substance remaining after an integral number of half lives have passed.		
g. * Students know protons and neutrons have substructures and consist of particles called quarks.		

Science

Standards Alignment Map

Physics

DRAFT — December 1, 2004

Physics — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
Motion and Forces 1. Newton's laws predict the motion of most objects. As a basis for understanding this concept:		
a. Students know how to solve problems that involve constant speed and average speed.		
b. Students know that when forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest (Newton's first law).		
c. Students know how to apply the law F = ma to solve one-dimensional motion problems that involve constant forces (Newton's second law).		
d. Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law).		
e. Students know the relationship between the universal law of gravitation and the effect of gravity on an object at the surface of Earth.		
f. Students know applying a force to an object perpendicular to the direction of its motion causes the object to change direction but not speed (e.g., Earth's gravitational force causes a satellite in a circular orbit to change direction but not speed).		
g. * Students know the evidence for the existence of planets orbiting other stars		
h. * Students know Newton's laws are not exact but provide very good approximations unless an object is moving close to the speed of light or is small enough that quantum effects are important.		
i. * Students know how to solve two-dimensional trajectory problems.		
j. * Students know how to resolve two-dimensional vectors into their components and calculate the magnitude and direction of a vector from its components.		
k. * Students know how to solve two-dimensional problems involving balanced forces (statics).		
l. * Students know how to solve problems in circular motion by using the formula for centripetal acceleration in the following form: a = v2/r.		
m. * Students know how to solve problems involving the forces between two electric charges at a distance (Coulomb's law) or the forces between two masses at a distance (universal gravitation).		

Conservation of Energy and Momentum 2. The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects. As a basis for understanding this concept:		
a. Students know how to calculate kinetic energy by using the formula E = (1/2)mv2.		
b. Students know how to calculate changes in gravitational potential energy near Earth by using the formula (change in potential energy) = mgh (h is the change in the elevation).		

c. Students know how to solve problems involving conservation of energy in simple systems, such as falling objects.		
d. Students know how to calculate momentum as the product mv.		
e. Students know momentum is a separately conserved quantity different from energy.		
f. Students know an unbalanced force on an object produces a change in its momentum.		
g. Students know how to solve problems involving elastic and inelastic collisions in one dimension by using the principles of conservation of momentum and energy.		
h. * Students know how to solve problems involving conservation of energy in simple systems with various sources of potential energy, such as capacitors and springs.		

Heat and Thermodynamics 3. Energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat. As a basis for understanding this concept:		
a. Students know heat flow and work are two forms of energy transfer between systems.		
b. Students know that the work done by a heat engine that is working in a cycle is the difference between the heat flow into the engine at high temperature and the heat flow out at a lower temperature (first law of thermodynamics) and that this is an example of the law of conservation of energy.		
c. Students know the internal energy of an object includes the energy of random motion of the object's atoms and molecules, often referred to as thermal energy. The greater the temperature of the object, the greater the energy of motion of the atoms and molecules that make up the object.		
d. Students know that most processes tend to decrease the order of a system over time and that energy levels are eventually distributed uniformly.		
e. Students know that entropy is a quantity that measures the order or disorder of a system and that this quantity is larger for a more disordered system.		
f. * Students know the statement "Entropy tends to increase" is a law of statistical probability that governs all closed systems (second law of thermodynamics).		
g. * Students know how to solve problems involving heat flow, work, and efficiency in a heat engine and know that all real engines lose some heat to their surroundings.		

Waves 4. Waves have characteristic properties that do not depend on the type of wave. As a basis for understanding this concept		
a. Students know waves carry energy from one place to another.		
b. Students know how to identify transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves).		
c. Students know how to solve problems involving wavelength, frequency, and wave speed.		

d. Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates.		
e. Students know radio waves, light, and X-rays are different wavelength bands in the spectrum of electromagnetic waves whose speed in a vacuum is approximately 3 x 108m/s (186,000 miles/second).		
f. Students know how to identify the characteristic properties of waves: interference (beats), diffraction, refraction, Doppler effect, and polarization.		

Electric and Magnetic Phenomena 5. Electric and magnetic phenomena are related and have many practical applications. As a basis for understanding this concept:		
a. Students know how to predict the voltage or current in simple direct current (DC) electric circuits constructed from batteries, wires, resistors, and capacitors.		
b. Students know how to solve problems involving Ohm's law.		
c. Students know any resistive element in a DC circuit dissipates energy, which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula Power = IR (potential difference) x I (current) = 12R.		
d. Students know the properties of transistors and the role of transistors in electric circuits.		
e. Students know charged particles are sources of electric fields and are subject to the forces of the electric fields from other charges.		
f. Students know magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources.		
g. Students know how to determine the direction of a magnetic field produced by a current flowing in a straight wire or in a coil.		
h. Students know changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors.		
i. Students know plasmas, the fourth state of matter, contain ions or free electrons or both and conduct electricity.		
j. * Students know electric and magnetic fields contain energy and act as vector force fields.		
k. * Students know the force on a charged particle in an electric field is qE, where E is the electric field at the position of the particle and q is the charge of the particle.		
l. * Students know how to calculate the electric field resulting from a point charge.		
m. * Students know static electric fields have as their source some arrangement of electric charges.		

Physics — California Science Standards

n. * Students know the magnitude of the force on a moving particle (with charge q) in a magnetic field is qvB sin(a), where a is the angle between v and B (v and B are the magnitudes of vectors v and B, respectively), and students use the right-hand rule to find the direction of this force.		
o. * Students know how to apply the concepts of electrical and gravitational potential energy to solve problems involving conservation of energy.		

Science

Standards Alignment Map

Investigation and Experimentation

DRAFT — December 1, 2004

Investigation and Experimentation HS — California Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's Science Standards in the following context:
1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will:		
The environmental principles and concepts provide fertile ground for the development of investigations and experiments that are directly related to achieving mastery of California's science content standards. As stated by the California State Board of Education, such "*activities must be cohesive, connected and build on each other to lead students to a comprehensive understanding of the California Science Content Standards."* Environment-based investigations and experiments can also help teachers conform to recommendations of the California State Board of Education that "*hands-on activities compos(e) at least 20 to 25 percent of the science instructional program (as specified in the California Science Framework).*"		
a. Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.		
b. Identify and communicate sources of unavoidable experimental error.		
c. Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.		
d. Formulate explanations by using logic and evidence.		
e. Solve scientific problems by using quadratic equations and simple trigonometric, exponential, and logarithmic functions.		
f. Distinguish between hypothesis and theory as scientific terms.		
g. Recognize the usefulness and limitations of models and theories as scientific representations of reality.		
h. Read and interpret topographic and geologic maps.		
i. Analyze the locations, sequences, or time intervals that are characteristic of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem).		
j. Recognize the issues of statistical variability and the need for controlled tests.		
k. Recognize the cumulative nature of scientific evidence.		
l. Analyze situations and solve problems that require combining and applying concepts from more than one area of science.		
m. Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.		

Investigation and Experimentation HS — California Science Standards

n. Know that when an observation does not agree with an accepted scientific theory, the observation is sometimes mistaken or fraudulent (e. g., the Piltdown Man fossil or unidentified flying objects) and that the theory is sometimes wrong (e.g., the Ptolemaic model of the movement of the Sun, Moon, and planets).		

History/Social Science

Standards Alignment Map

Kindergarten

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students understand that being a good citizen involves acting in certain ways.		
Follow rules, such as sharing and taking turns, and know the consequences of breaking them.	II d; V a	• There are basic rules people need to follow regarding natural systems and the treatment of goods and ecosystem services they provide. • There are consequences to not following the rules that help protect the environment; these consequences may influence decisions regarding resources and natural systems.
Learn examples of honesty, courage, determination, individual responsibility, and patriotism in American and world history from stories and folklore.	V a	• There are many individuals whose personal values led them to fight to protect resources and natural systems.
Know beliefs and related behaviors of characters in stories from times past and understand the consequences of the characters' actions.	V b	• The ways people assess the value of the environment have changed over time. • There are consequences to the long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems that result from the decisions made by some of these characters. • Characters in stories make decisions that have consequences. In our daily lives, we make decisions that have consequences. Our choices and decisions can have a positive, neutral or detrimental influence on the environment.
2. Students recognize national and state symbols and icons such as the national and state flags, the bald eagle, and the Statue of Liberty.		
	V a	• The images portrayed on national and state flags and icons are often animals that have great symbolic importance to people.
3. Students match simple descriptions of work that people do and the names of related jobs at the school, in the local community, and from historical accounts.		
	II b c d	• There are many jobs related to extraction, harvesting, transporting and consuming natural resources. Some of these jobs have changed over time. • There are many jobs related to the operation of human communities. Some of these jobs have changed over time. • There are many jobs related to making or enforcing laws, regulations, policies, and incentives that govern the use and management of natural resources. Some of these jobs have changed over time.
4. Students compare and contrast the locations of people, places, and environments and describe their characteristics.		
1. Determine the relative locations of objects using the terms near/far, left/right, and behind/in front.		
2. Distinguish between land and water on maps and globes and locate general areas referenced in historical legends and stories.	I a	• Land and water are resources (goods) provided by the natural system (Earth). • Resources can be identified (e.g., water, forests, deserts) on a map. • Cities are often built next to or very near the sources of natural resources (e.g., water, timber).
3. Identify traffic symbols and map symbols (e.g., those for land, water, roads, cities).		
4. Construct maps and models of neighborhoods, incorporating such structures as police and fire stations, airports, banks, hospitals, supermarkets, harbors, schools, homes, places of worship, and transportation lines.	I a b	• Some of our neighborhoods include natural systems and their components (e.g., streams, parks, wooded areas). • The natural systems in our neighborhoods provide some goods and ecosystem services.
5. Demonstrate familiarity with the school's layout, environs, and the jobs people do there.	I a; II a b c d	• The school operates in and around natural systems and their components (open areas, trees, etc.). • The environment surrounding the school today is different than it was when the school was built. • The school's students and staff members have a variety of practices related to the use and maintenance of any natural systems at the school (e.g., school gardens, green spaces).

5. Students put events in temporal order using a calendar, placing days, weeks, and months in proper order.		
	III a b	• Seasonal changes in weather are part of one of the cycles that influence natural systems. • As a result of seasonal changes, natural systems produce different goods and ecosystem services during times of the year.

6. Students understand that history relates to events, people, and places of other times.		
1. Identify the purposes of, and the people and events honored in, commemorative holidays, including the human struggles that were the basis for the events (e.g., Thanksgiving, Independence Day, Washington's and Lincoln's Birthdays, Martin Luther King Jr. Day, Memorial Day, Labor Day, Columbus Day, Veterans Day).	I a b	• Some holidays honor explorers or groups of people who traveled to new areas seeking the goods and ecosystem services provided by natural systems (e.g., Thanksgiving and Columbus Day).
2. Know the triumphs in American legends and historical accounts through the stories of such people as Pocahontas, George Washington, Booker T. Washington, Daniel Boone, and Benjamin Franklin.	I a; II a b c	• Many of the triumphs of these people revolved around the discovery, extraction, harvest and consumption of natural resources. • This drove many of their decisions to explore and expand human communities into new areas on the American continent. • These decisions had significant effects on natural systems in the areas that were explored and settled.
3. Understand how people lived in earlier times and how their lives would be different today (e.g., getting water from a well, growing food, making clothing, having fun, forming organizations, living by rules and laws).	I a b; II a b c d; V b	• People in earlier times used many of the same goods and ecosystem services from natural systems as we do today. • In earlier times people more directly consumed the goods and ecosystem services from natural systems rather than obtaining them from secondary sources (e.g., food markets, lumber yards). • The quantity of goods consumed by human communities has changed over time (e.g., water and energy consumption). • Human communities have expanded over time and now use more diverse natural resources than they did in the past (e.g., petroleum-based products such as oil and plastics). • The way in which we assess and make decisions about social, economic, political, and environmental factors has changed over time.

History/Social Science

Standards Alignment Map

First Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students describe the rights and individual responsibilities of citizenship.		
1. Understand the rule-making process in a direct democracy (everyone votes on the rules) and in a representative democracy (an elected group of people make the rules), giving examples of both systems in their classroom, school, and community.	V a b	• There is a spectrum of laws, regulations, and policies regarding the management of natural systems and resources. • The rule-making process extends from small-group decisions in the classroom to laws that govern the larger community. • Decisions regarding the management of natural systems and resources are made in the same manner as other rules in a direct or representative democracy.
2. Understand the elements of fair play and good sportsmanship, respect for the rights and opinions of others, and respect for rules by which we live, including the meaning of the "Golden Rule."	V a	• A sense of fairness and respect for both the rights and opinions of others are among the factors to be considered in making decisions about the extraction, harvesting, transportation and consumption of natural resources as well as the growth and expansion of human communities.
2. Students compare and contrast the absolute and relative locations of places and people and describe the physical and/or human characteristics of places.		
1. Locate on maps and globes their local community, California, the United States, the seven continents, and the four oceans.	I a b	• Human communities are generally located in close proximity to the natural systems that provide the goods and ecosystem services upon which humans depend. • These natural systems can be located on maps that identify specific land masses and bodies of water.
2. Compare the information that can be derived from a three-dimensional model to the information that can be derived from a picture of the same location.		
3. Construct a simple map, using cardinal directions and map symbols.		
4. Describe how location, weather, and physical environment affect the way people live, including the effects on their food, clothing, shelter, transportation, and recreation.	I a b c; II a b c	• Location, weather, and the physical environment interact to create specific conditions that determine the goods and ecosystem services that humans use for food, clothing, shelter, transportation, and recreation. • Human communities are generally located in close proximity to the natural systems that provide the goods and ecosystem services upon which humans depend. • The physical environment can change as a result of human activities and naturally-occurring events. • These changes can affect how people live.
3. Students know and understand the symbols, icons, and traditions of the United States that provide continuity and a sense of community across time.		
1. Recite the Pledge of Allegiance and sing songs that express American ideals (e.g., "My Country 'Tis of Thee").	I a b	• Many American songs express appreciation for the natural systems and resources that our country provides (e.g., *This Land is Your Land*).
2. Understand the significance of our national holidays and the heroism and achievements of the people associated with them.	I a b	• Some holidays honor the heroism and achievements of explorers or groups of people who traveled to new areas seeking the goods and ecosystem services provided by natural systems (e.g., Thanksgiving and Columbus Day). • Other holidays celebrate the value of natural resources (e.g., Arbor Day, May Day, and Thanksgiving).
3. Identify American symbols, landmarks, and essential documents, such as the flag, bald eagle, Statue of Liberty, U.S. Constitution, and Declaration of Independence, and know the people and events associated with them.	II a b	• The images portrayed on national and state flags and icons are often animals that have great symbolic importance to people. • The populations of several of the animal portrayed on these flags and icons have been influenced by the effects of the methods used to extract, harvest, transport and consume natural resources.

4. Students compare and contrast everyday life in different times and places around the world and recognize that some aspects of people, places, and things change over time while others stay the same.		
1. Examine the structure of schools and communities in the past.	I a b; II a b c d; V b	• Schools and communities in the past relied on the goods and ecosystem services provided by natural systems, just as we do today. • The ways in which schools and communities used resources in the past is different than those today. • Populations and communities have grown and changed over time and now consume more resources and have greater effects on natural systems. • Laws, regulations, policies and incentives that govern the use and management of natural resources and systems have changed over time. • The ways we assess social, economic, political, and environmental factors and make decisions about resources and natural systems have changed over time. Changing environmental quality may influence the way we make decisions.
2. Study transportation methods of earlier days.	I a b; II a b c; V a b	• Methods of transportation in the past relied on goods and ecosystem services provided by natural systems. • This is still true today, although the rate of consumption of energy resources has increased and the impact of transportation methods on natural systems is more pronounced. • The distances people traveled in the past were often shorter than distances traveled routinely today with the growth and expansion of human communities. This has led to development and operation of more extensive transportation systems that have greater influence on natural systems. • Consideration of the factors that affect environmental quality may influence the way we make decisions.
3. Recognize similarities and differences of earlier generations in such areas as work (inside and outside the home), dress, manners, stories, games, and festivals, drawing from biographies, oral histories, and folklore.	II b; V b	• In the past, a greater proportion of jobs were directly related to the extraction, harvesting, transporting and consumption of natural resources. • The jobs related to the extraction, harvesting, transporting and consumption of natural resources have changed dramatically over time. • Some of these changes in jobs have resulted from changing assessment of social, economic, political, and environmental factors over time.

5. Students describe the human characteristics of familiar places and the varied backgrounds of American citizens and residents in those places.		
1. Recognize the ways in which they are all part of the same community, sharing principles, goals, and traditions despite their varied ancestry; the forms of diversity in their school and community; and the benefits and challenges of a diverse population.	V a b	• Decisions regarding natural systems and resources are made in similar ways in all American communities and include consideration of socio-cultural factors. • Decision-making in a community of varied cultures is influenced by socio-cultural factors including differing traditions and beliefs.
2. Understand the ways in which American Indians and immigrants have helped define Californian and American culture.	I a b; V a	• The beliefs, customs, ceremonies, traditions, and social practices of American Indians and immigrants are significantly influenced by the natural systems where those cultures are located and by the natural resources upon which they depend. • The practices, traditions and beliefs of American Indians and immigrants have become infused into Californian and American culture.
3. Compare the beliefs, customs, ceremonies, traditions, and social practices of the varied cultures, drawing from folklore.	V a	• The beliefs, customs, ceremonies, traditions, and social practices of varied cultures are significantly influenced by the natural systems where those cultures are located and by the natural resources upon which these cultures depend. These traditions and socio-cultural factors have affected decisions about the use and management of resources and natural systems throughout history.

6. Students understand basic economic concepts and the role of individual choice in a free-market economy.		
1. Understand the concept of exchange and the use of money to purchase goods and services.	I a b c; IV a; V a	• Money is used to purchase goods and utilize ecosystem services since most individuals no longer directly extract, harvest or transport the goods they use from natural systems. • Decisions about the use resources are frequently based on economic factors. • Economic factors, including supply and demand, can affect the quantity and methods used to extract, harvest or transport the goods humans use from natural systems.
2. Identify the specialized work that people do to manufacture, transport, and market goods and services and the contributions of those who work in the home.	I a b; II b c	• There are many specialized jobs related to the extraction, harvesting, manufacture, transport and marketing of goods and services that come directly or indirectly from natural systems. • Many of these jobs have changed dramatically over time as the methods used to extract, harvest or transport these goods and ecosystem services have changed.

History/Social Science

Standards Alignment Map

Second Grade

DRAFT — December 1, 2004

Second Grade — California History/Social Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students differentiate between things that happened long ago and things that happened yesterday.		
1. Trace the history of a family through the use of primary and secondary sources, including artifacts, photographs, interviews, and documents.		
2. Compare and contrast their daily lives with those of their parents, grandparents, and/ or guardians.	I a b; II a b c d; V b	• The goods and ecosystem services provided by natural systems are essential to our way of life. The way we use those goods and services has changed over time and can be discovered by comparing our daily lives with those of recent generations. • We have many machines and other material objects today that our ancestors did not. Each offers benefits and costs. • Human populations and communities have grown, and the ways in which people procure and consume natural resources have changed in recent decades. The laws and policies that govern the use and management of natural resources have also changed. • These changes directly and indirectly influence the viability of the natural systems upon which we depend. • The ways we assess social, economic, political, and environmental factors and make decisions about resources and natural systems have changed over time. Changing environmental quality may influence the way we make decisions.
3. Place important events in their lives in the order in which they occurred (e.g., on a time line or storyboard).		

2. Students demonstrate map skills by describing the absolute and relative locations of people, places, and environments.		
1. Locate on a simple letter-number grid system the specific locations and geographic features in their neighborhood or community (e.g., map of the classroom, the school).	I a b	• These natural systems can be located on maps that identify specific land masses and bodies of water.
2. Label from memory a simple map of the North American continent, including the countries, oceans, Great Lakes, major rivers, and mountain ranges. Identify the essential map elements: title, legend, directional indicator, scale, and date.		
3. Locate on a map where their ancestors live(d), telling when the family moved to the local community and how and why they made the trip.	I a b ; II a c d	• People rely on goods and ecosystem services provided directly or indirectly by natural systems. People generally move to gain access to increased quantity or quality of resources. • Locating specific communities on a map helps us understand the influence that access to natural resources has on the establishment and growth of human communities. • Human populations and communities have expanded over time. Their influence on the viability of natural systems has also increased. • As human populations increase in an area, competition for resources increases. This is one of the causes of emigration/immigration.

4. Compare and contrast basic land use in urban, suburban, and rural environments in California.	I a b; II a b c d; IV a c; V a b	• Land use patterns in urban, suburban, and rural environments vary in the degree to which they influence the geographic extent, composition, biological diversity, and viability of natural systems. • Land use patterns in urban, suburban, and rural environments vary in the quantities and types of resources used and the quantity and characteristics of the resulting byproducts. • Land use patterns have changed over time. • The capacity of natural systems to adjust to human-caused alterations depends on the nature of the system and the scope, scale, and duration of the activity and the nature of its byproducts. These alterations vary with the different land use practices found in urban, suburban, and rural environments. • The factors influencing decisions about resources and natural systems vary with the type of community and the particular needs and priorities of that community. People in urban, suburban, and rural environments are likely to bring different perspectives to bear when making decisions about resources and natural systems. • Land use practices in urban, suburban, and rural environments may change over time as we change our assessment of social, economics, political and environmental factors affecting those factors. • Different areas have different legal and political issues and different levels of restrictions placed upon them.

3. Students explain governmental institutions and practices in the United States and other countries.		
1. Explain how the United States and other countries make laws, carry out laws, determine whether laws have been violated, and punish wrongdoers.	V a	• The process of making and enforcing laws to govern the use and management of natural systems is similar to that used for other laws.
2. Describe the ways in which groups and nations interact with one another to try to resolve problems in such areas as trade, cultural contacts, treaties, diplomacy, and military force.	I a b; II d; V a b	• Conflicts among groups and nations often arise over access to and distribution of the goods and ecosystem services produced by natural systems and that are considered essential to human communities. • The expansion and operation of human communities have an impact on the natural systems that surround them. Communities (nations) make laws, develop policies, or offer incentives in regards to use and management of natural resources, and those laws, policies, and incentives have an effect on the natural systems. • The ways in which groups and nations interact to try to resolve problems have varying degrees of impact on the quality and quantity of resources and viability of natural systems. • The ways in which decisions are made may change over time in response to how we assess social, economic, political, and environmental factors.

4. Students understand basic economic concepts and their individual roles in the economy and demonstrate basic economic reasoning skills.		
1. Describe food production and consumption long ago and today, including the roles of farmers, processors, distributors, weather, and land and water resources.	I a b c; II a b c; III b c; IV a b; V b	• The health of natural systems and natural processes such as climate and weather affect the quality, quantity, and reliability of food resources. • Food production and consumption have direct and indirect influences on natural systems. The methods used to produce, harvest, transport and consume food resources influence the geographic extent, composition, biological diversity, and viability of natural systems. • Many individuals depend on the production and consumption of food for their livelihoods. The demands on these individuals have increased due to the growth in human populations and their consumption rates. • Humans depend on and use the cycles and processes operating within natural systems to produce food. • Human practices such as farming or ranching can alter these cycles and processes. • The effects of food production on natural systems are directly related to the quantities of resources consumed and the quantity and characteristics of the resulting byproducts (such as agricultural runoff and pesticides). These byproducts are not readily prevented from entering natural systems and may be beneficial, neutral or detrimental in their effects. • The ways in which food production has been managed have been adjusted over time in response to changing assessments of social, economic, political, and environmental factors.
2. Understand the role and interdependence of buyers (consumers) and sellers (producers) of goods and services.		
3. Understand how limits on resources affect production and consumption (what to produce and what to consume).	I c; II a b c d; V a	• The health of natural systems limits the quality, quantity and reliability of the goods and ecosystem services provided by those systems. • Direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the quality, quantity and reliability of the goods and services provided by natural systems. • Limits on the goods and ecosystem services provided by natural systems influence the decisions humans make regarding production and consumption. These decisions are complex and influenced by a spectrum of factors.

5. Students understand the importance of individual action and character and explain how heroes from long ago and the recent past have made a difference in others' lives (e.g., from biographies of Abraham Lincoln, Louis Pasteur, Sitting Bull, George Washington Carver, Marie Curie, Albert Einstein, Golda Meir, Jackie Robinson, Sally Ride).		
	V a	• Students understand the importance of individual action and the role these action have in influencing decisions people make regarding natural resources and systems.

History/Social Science

Standards Alignment Map

Third Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students describe the physical and human geography and use maps, tables, graphs, photographs, and charts to organize information about people, places, and environments in a spatial context.		
1. Identify geographical features in their local region (e.g., deserts, mountains, valleys, hills, coastal areas, oceans, lakes).	I a b	• Human communities are generally located in close proximity to the natural systems that provide the goods and ecosystem services upon which humans depend. • These natural systems can be located on maps that identify specific land masses and bodies of water. • Local geographic features influence the availability of goods and ecosystem services from natural systems in their region.
2. Trace the ways in which people have used the resources of the local region and modified the physical environment (e.g., a dam constructed upstream changed a river or coastline).	I a b c; II c; III b c; V a b	• The natural systems within local regions provide goods and ecosystem services essential to human life and to the functioning of our economies and cultures. • The health of local natural systems affects the quality, quantity, and reliability of the goods and ecosystem services provided by those systems. • Modifications to the physical environment due to the operation and expansion of human communities influence the geographic extent, composition, biological diversity, and viability of natural systems. • By modifying the physical environment, human practices can alter the cycles and processes that operate within natural systems. • Decisions about modifying the physical environment are complex and involve a spectrum of considerations. • The assessment of social, economic, political, and environmental considerations has changed over time, which influences how such decisions are made.
2. Students describe the American Indian nations in their local region long ago and in the recent past.		
1. Describe national identities, religious beliefs, customs, and various folklore traditions.	III b; V a	• The beliefs, customs, ceremonies, traditions, and social practices of American Indians are significantly influenced by the natural systems in which those cultures are located and by the natural resources upon which they depend. • Some of the beliefs of Indian nations are influenced by the cycles and processes that operate within the natural systems in the areas where they live. • Many aspects of their national identities, religious beliefs, customs, and folklore traditions are based on the natural systems where they live and the natural resources they consume. • These socio-cultural factors are considered when decisions about natural systems and resource use are made.
2. Discuss the ways in which physical geography, including climate, influenced how the local Indian nations adapted to their natural environment (e.g., how they obtained food, clothing, tools).	I a b; II b, III b	• Physical geography influences the goods and ecosystem services provided by natural systems. The availability of goods and services influences how local Indian nations have adapted to their natural environment. • The practices of Indian nations have depended upon and benefited from the cycles and processes that operated within natural systems in the areas where they live.
3. Describe the economy and systems of government, particularly those with tribal constitutions, and their relationship to federal and state governments.	I a; V a b	• Historically, the economies of American Indian nations were based on the natural systems in the areas where they lived and the natural resources they consumed. • The assessment of social, economic, political, and environmental factors has changed over time and influences the way in which decisions are made.
4. Discuss the interaction of new settlers with the already established Indians of the region.	I a b; II c d	• Control and consumption of the goods and ecosystem services provided by natural systems were the basis for the conflicts between the Indians of a particular region and the new settlers. • In some cases, the new settlers learned to take advantage of some of these goods and ecosystem services through their interactions with the established Indians of the region.

3. Students draw from historical and community resources to organize the sequence of local historical events and describe how each period of settlement left its mark on the land.		
1. Research the explorers who visited here, the newcomers who settled here, and the people who continue to come to the region, including their cultural and religious traditions and contributions.	I a b; V a	• Explorers traveled to new areas seeking the goods and ecosystem services provided by the natural systems. • Settlers and people who continue to come to an area are drawn to local regions in part by the availability of goods and ecosystem services provided by natural systems. • Settlers and people who continue to come to an area bring their varied cultural and religious traditions to bear as they make decisions about resources and natural systems.
2. Describe the economies established by settlers and their influence on the present-day economy, with emphasis on the importance of private property and entrepreneurship.	I a b; II d; V a b	• Natural systems provided goods and ecosystem services that settlers used to meet their needs and support their economies. • The importance placed by settlers on private property and the inherent rights and responsibilities of land ownership are economic factors that continue to influence decisions about resources and natural systems.
3. Trace why their community was established, how individuals and families contributed to its founding and development, and how the community has changed over time, drawing on maps, photographs, oral histories, letters, newspapers, and other primary sources.	I a b; II c; III a b c; V b	• Most communities were established in areas that offered ready access to the goods and ecosystem services provided by natural systems. • These communities were located where people could benefit from the cycles and processes that yield goods and ecosystem services. • Practices within these communities can alter the cycles and processes in local natural systems. • The expansion and operation of human society have influenced the geographic extent, composition, biological diversity, and viability of the natural systems. • The decisions communities make regarding resources and natural systems have changed over time in response to how social, economic, political and environmental factors are assessed.

4. Students understand the role of rules and laws in our daily lives and the basic structure of the U.S. government.		
1. Determine the reasons for rules, laws, and the U.S. Constitution; the role of citizenship in the promotion of rules and laws; and the consequences for people who violate rules and laws.	II d; V a b	• Decisions that affect natural systems are based on a wide range of considerations and decision-making processes. • Certain rules and laws are made to conserve natural systems. • The assessment of social, economic, political, and environmental factors has changed over time.
2. Discuss the importance of public virtue and the role of citizens, including how to participate in a classroom, in the community, and in civic life.	II d; V a b	• Individual citizens have opportunities and a civic responsibility to participate in decision-making about resources and natural systems as a part of their civic life. • Individual citizens have the opportunity protect the environment.
3. Know the histories of important local and national landmarks, symbols, and essential documents that create a sense of community among citizens and exemplify cherished ideals (e.g., the U.S. flag, the bald eagle, the Statue of Liberty, the U.S. Constitution, the Declaration of Independence, the U.S. Capitol).		
4. Understand the three branches of government, with an emphasis on local government.		
5. Describe the ways in which California, the other states, and sovereign American Indian tribes contribute to the making of our nation and participate in the federal system of government.		
6. Describe the lives of American heroes who took risks to secure our freedoms (e.g., Anne Hutchinson, Benjamin Franklin, Thomas Jefferson, Abraham Lincoln, Frederick Douglass, Harriet Tubman, Martin Luther King, Jr.).		

5. Students demonstrate basic economic reasoning skills and an understanding of the economy of the local region.		
1. Describe the ways in which local producers have used and are using natural resources, human resources, and capital resources to produce goods and services in the past and the present.	I a b; II a b c d; IV a b	• Local producers use natural resources and ecosystem services, and continue to produce goods as they had in the past. • Land use and conversion have changed over time (e.g., agricultural land to parking lot).
2. Understand that some goods are made locally, some elsewhere in the United States, and some abroad.	I a b c; II a b c d; IV a b: V a	• Goods are made locally, within the United States, or abroad. Each presents a set of costs and benefits.
3. Understand that individual economic choices involve trade-offs and the evaluation of benefits and costs.	V a	• Individual economic choices are complex and influenced by a wide spectrum of considerations. Economic, legal, environmental, public health, and socio-cultural considerations are among the factors that are considered in discussions of trade-offs and the analysis of costs and benefits.
4. Discuss the relationship of students' "work" in school and their personal human capital.		

History/Social Science

Standards Alignment Map

Fourth Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students demonstrate an understanding of the physical and human geographic features that define places and regions in California**.**		
1. Explain and use the coordinate grid system of latitude and longitude to determine the absolute locations of places in California and on Earth.		
2. Distinguish between the North and South Poles; the equator and the prime meridian; the tropics; and the hemispheres, using coordinates to plot locations.		
3. Identify the state capital and describe the various regions of California, including how their characteristics and physical environments (e.g., water, landforms, vegetation, climate) affect human activity.	I a b	• The different regions of California have different characteristics and physical environments. Each region provides goods and ecosystem services—some unique to the region—that are essential to human life and to the functioning of our economies and cultures.
4. Identify the locations of the Pacific Ocean, rivers, valleys, and mountain passes and explain their effects on the growth of towns.	I a b; II a; III a b; V a b	• Oceans, rivers, valleys, and mountain passes influence the availability of goods and ecosystem services provided by natural systems for human use. • The cycles and processes that operate within natural systems have contributed to the formation of oceans, rivers, valley, and mountain passes. Humans depend on these passageways for movement and for the transport of goods and use of ecosystem services. • The decision to settle in certain areas and build towns was often made around geographic features and natural systems (e.g., water supplies), or in order to control the human use of these features. As time has passed and human populations and technology have both advanced, the factors influencing the siting of towns have also changed. • Although factors influencing the location of towns have changed, towns are still dependent on natural resources such as water.
5. Use maps, charts, and pictures to describe how communities in California vary in land use, vegetation, wildlife, climate, population density, architecture, services, and transportation.	I a b; II a b c d; III a b c; V a	• The regions of California and the natural systems they contain provide the goods and ecosystem services essential to our lifestyles and culture. The resources available in an area influence the type of economy and culture that develops in each area. • California communities vary in their populations, how they produce and consume resources, operate their communities, and make laws, policies and offer incentives regarding natural resource supply and use, all of which affect the viability of natural systems and the resources they provide. • The cycles and processes that operate within natural systems have created varied patterns of vegetation, wildlife, and climate. Humans depend on these cycles and processes because they in part determine patterns of land use. • Human practices can alter these cycles and processes and influence the viability of California's natural communities. • Decisions about land use and community development are complex and influenced by a spectrum of considerations.

2. Students describe the social, political, cultural, and economic life and interactions among people of California from the pre-Columbian societies to the Spanish mission and Mexican rancho periods.		
1. Discuss the major nations of California Indians, including their geographic distribution, economic activities, legends, and religious beliefs; and describe how they depended on, adapted to, and modified the physical environment by cultivation of land and use of sea resources.	I a b; II a b c; III b c; IV a b c; V a b	• The major nations of California Indians have depended on, adapted to, and modified the physical environment, which supplied goods and ecosystem services essential to their lives, economies, and cultures. • California Indian nations have depended on different resources, goods and ecosystem services and developed different land use patterns and economic activities, depending upon their region. • The ways in which California Indians cultivated land and used sea resources in the past influenced the viability of natural systems. • The consumption of goods and use of ecosystem services by California Indians, and the resulting byproducts, have had direct and indirect effects on natural systems that influenced the geographic extent, composition, biological diversity, and viability of natural systems. • The methods used by California Indian nations to extract, harvest, transport and consume natural resources have influenced the geographic extent, composition, biological diversity, and viability of natural systems. • California Indian nations depend on the cycles and processes operating within natural systems because they in part determine the goods and ecosystem services available for their use. • The practices of California Indian nations have altered the cycles and processes that operate within natural systems. • California Indians' decisions about resources and natural systems are influenced by their geographic distribution, economic activities, legends, religious beliefs, and land use practices.
2. Identify the early land and sea routes to, and European settlements in California with a focus on the exploration of the North Pacific (e.g., by Captain James Cook, Vitus Bering, Juan Cabrillo), noting especially the importance of mountains, deserts, ocean currents, and wind patterns.	I a b; II a b c; III b	• The exploration of the North Pacific revolved around the discovery, extraction, harvest and consumption of natural resources. • The consumption of goods and use of ecosystem services by European settlements in California, and the resulting byproducts, had direct and indirect effects on natural systems that influenced the geographic extent, composition, biological diversity, and viability of natural systems. • The need for new sources of natural resources drove the decisions to explore and expand human communities into new areas of the North Pacific. • The exploration of the North Pacific was influenced by geographic features including mountains, deserts, ocean currents, and wind patterns. Early land and sea routes to California allowed further exploration and settlement in areas where goods and ecosystem services were accessible. • European settlement of California was driven by the availability of goods and ecosystem services provided by the region's natural systems.
3. Describe the Spanish exploration and colonization of California, including the relationships among soldiers, missionaries, and Indians (e.g., Juan Crespi, Junipero Serra, Gaspar de Portola).	I a b; II a b c d; V a	• Spanish exploration and colonization of California revolved around the discovery, extraction, harvest and consumption of natural resources. • The need for new sources of natural resources drove the decisions to explore and expand human communities into new areas of California. • Spanish colonization of California was driven by the availability of goods and ecosystem services provided by the region's natural systems. • Direct and indirect changes to natural systems resulted from the Spanish exploration and colonization of California. The growth of populations and communities, the methods of resource production and consumption, the operation of growing communities, and the laws and policies governing resource use all influenced the viability of natural systems. • Decisions about resources and natural systems made during Spanish colonization of California were influenced by the relationships between and the varying perspectives of the soldiers, missionaries, and Indians populating the area.

4. Describe the mapping of, geographic basis of, and economic factors in the placement and function of the Spanish missions; and understand how the mission system expanded the influence of Spain and Catholicism throughout New Spain and Latin America.	I a b; II a b c d	• The placement and function of the Spanish missions were based in part of the availability of the goods and ecosystem services produced by natural systems and the geographic features that yielded these goods and services. • The economies were based in part on the exchange of goods and services drawn from the surrounding natural systems. • The concentration of populations within the mission system in California had an effect on the surrounding resources and natural systems. The natural resource supply methods and consumption patterns of the missions, the way the missions were operated, and the laws, policies and incentives governing resource use and management all influenced the viability of the surrounding natural systems.
5. Describe the daily lives of the people, native and nonnative, who occupied the presidios, missions, ranchos, and pueblos.	I a b; II a b c; III b c; V a b	• The jobs of the people who lived in the presidios, missions, ranchos, and pueblos of California were directly related to the extraction, harvesting, transporting and consumption of natural resources. • Decisions about the locations of presidios, missions, ranchos, and pueblos of California were based on the availability of natural resources. • Decisions about resource use in and around the presidios, missions, ranchos, and pueblos of California were based on a spectrum of considerations. Those decisions may have changed over time in response to changes in the natural systems themselves. • The influence of human communities in a particular place varies depending upon the size of the community, the length of time spent in the location and the resources consumed.
6. Discuss the role of the Franciscans in changing the economy of California from a hunter-gatherer economy to an agricultural economy.	I a b; II a b c; IV a b; V a b	• The resources (goods and ecosystem services) available in California sustained both hunter-gatherer and agricultural ways of life. • By changing California from a hunter-gatherer to an agricultural economy, the Franciscan missionaries changed the way resources were produced and consumed. Communities became rooted to one location and began to expand. These changes influenced the geographic extent, composition, biological diversity, and viability of natural systems. • Decisions regarding resources and natural systems made by the Franciscans were influenced by a wide spectrum of economic, environmental, and socio-cultural factors. These decisions resulted in the conversion to an agricultural economy that still exists today. • The establishment of an agricultural economy changed the way social, political, economic, and environmental factors were assessed and influenced the ways decisions about resources and natural systems were made. • The influence of human communities in a particular place varies depending upon the size of the community, the length of time spent in the location and the resources consumed.

7. Describe the effects of the Mexican War for Independence on Alta California, including its effects on the territorial boundaries of North America.	I a b; II a b c d; V a	• California's natural systems and resources provided goods and ecosystem services that contributed to the location and expansions of human communities. • The Mexican War for Independence affected population growth, expansion of human communities and changes that resulted in resource production and use. • The operation of settlements in the territories resulted in changes to the methods and rates of extracting, harvesting, transporting and consuming natural resources. It also had an impact on the geographic extent, composition, biological diversity and viability of the natural systems where new communities developed. • New systems of government and new laws and policies regarding the management of the land and its resources developed in these communities. These changes also influenced the viability of natural systems in the territory. • The decision to go to war over territory in California was based on the desire to control or provide access to certain natural resources and systems. • Throughout history, political boundaries have been established so that a government or group of people have control of, and the sole responsibility for making decisions regarding, the natural resources and systems inside that boundary.
8. Discuss the period of Mexican rule in California and its attributes, including land grants, secularization of the missions, and the rise of the rancho economy.	I a b; II a b c d; III a b; V b	• California's natural systems and resources provided goods and ecosystem services that were valuable to human communities. • During the period of Mexican Rule, land grants, secularization of the missions, and the rise of the rancho economy expanded the rights, extent and manner in which individuals and groups were permitted to extract, harvest, transport and consume resources. These changes directly and indirectly impacted natural systems. • The rancho economy was dependent upon and benefited from the cycles and processes that operate within natural systems.

3. Students explain the economic, social, and political life in California from the establishment of the Bear Flag Republic through the Mexican-American War, the Gold Rush, and the granting of statehood.		
1. Identify the locations of Mexican settlements in California and those of other settlements, including Fort Ross and Sutter's Fort.	I a b; II a b; V a	• The locations of Mexican and other settlements were influenced by natural resources (goods and services) that were available there. • Economic, social and political decisions affected the management and use of natural resources, e.g., the decision for other nations (Russia) and people from other countries (John Sutter) to want to settle in California were based on resource availability and use. Fort Ross was established as a Russian settlement to hunt sea otter, to grow wheat and other crops for the Russian settlements in Alaska, and to trade with Spanish California. Sutter's Fort was established as a land grant to Sutter from the Mexican government and flourished as an agricultural community and eventually became the center of Gold Rush activities.
2. Compare how and why people traveled to California and the routes they traveled (e.g., James Beckwourth, John Bidwell, John C. Fremont, Pio Pico).	I a b; V a	• California's natural systems and resources provided goods and ecosystem services that were attractive to many because they offered means of survival and/or economic promise. For these reasons many people traveled to California. • The decision to seek out, settle, and act upon the resources in one area and not another depended on a variety of social, economic and political factors. • In some cases, the natural systems provided services as well as obstacles as settlers traveled to seek the resources of California, e.g., James Beckwourth discovered Beckwourth Pass through the Sierra Nevada, mapping and easing the way for gold hunters and settlers bound for California. James Bidwell crossed the Rockies and Sierras with the first overland expedition, arriving in the Sacramento Valley, to become successful in resource-based mining and agriculture.

3. Analyze the effects of the Gold Rush on settlements, daily life, politics, and the physical environment (e.g., using biographies of John Sutter, Mariano Guadalupe Vallejo, Louise Clapp).	I a b; II a b c d; III b c; IV a b c; V a b	• Gold is a natural resource that humans consider valuable; the climate and other natural services in California allowed it to be mined fairly easily and by anyone, and there was a reliable supply of it. • The quest for gold brought about rapid population growth and the construction and operation of new communities. These changing resource production and consumption patterns resulted in the need for new laws, policies, and incentives regarding resource use and management. These changes brought about direct and indirect changes to the surrounding natural systems and influenced the viability of those systems. • The cycles and processes operating in natural systems result in goods, such as gold, that humans value. • The practices employed during the Gold Rush altered these cycles and processes. • The byproducts of the Gold Rush communities and mining practices had significant effects on the environment. The byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral or detrimental in their effects. The capacity of the natural system to adjust to these human-caused alterations varied significantly by area and human practices. • During the Gold Rush, decisions made regarding resources and natural systems often were driven by the desire to control access to a natural resource, or limit the supply of the resource to others. • As natural systems became compromised over time, the ways people assessed the Gold Rush's social, economic, political, and environmental impacts also changed, thus influencing the ways decisions about resource use were made.
4. Study the lives of women who helped build early California (e.g., Biddy Mason).		
5. Discuss how California became a state and how its new government differed from those during the Spanish and Mexican periods.		

4. Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.		
1. Understand the story and lasting influence of the Pony Express, Overland Mail Service, Western Union, and the building of the transcontinental railroad, including the contributions of Chinese workers to its construction.	II a b c d; V a	• The growth of communication and transportation systems is a predictable extension of growing communities and populations. • Laws, policies, and incentives in communities are developed to promote these communication and transportation systems and their need for a reliable supply of resources. Communication and transportation systems influence the viability of natural systems. • Decisions regarding the establishment of transportation and communication systems during this time were based upon resources (labor supply, geography, burgeoning economic areas of the nation).

2. Explain how the Gold Rush transformed the economy of California, including the types of products produced and consumed, changes in towns (e.g., Sacramento, San Francisco), and economic conflicts between diverse groups of people.	I a b; II a b c d; III b c; IV a b c; V a b	• Gold is a natural resource that humans consider valuable; the climate and other natural services in California allowed it to be mined fairly easily and by anyone, and there was a reliable supply of it. • The quest for gold brought about rapid population growth, community construction and operation, changing resource production and consumption patterns, competition for resources, and new laws, policies, and incentives regarding resource use and management. These changes brought about direct and indirect changes to the surrounding natural systems and influenced the viability of those systems. • The cycles and processes operating in natural systems result in goods, such as gold, that humans value. The practices employed during the Gold Rush altered these cycles and processes. • The byproducts of the Gold Rush communities and mining practices had significant effects on the environment. The byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral or detrimental in their effects. The capacity of the natural system to adjust to these human-caused alterations varied significantly by area and human practices. • During the Gold Rush, decisions made regarding resources and natural systems often were driven by the desire to control access to a natural resource, or limit the supply of the resource to others. The rise of new products and economic conflicts between diverse groups of people influenced the decisions that were made. • As natural systems became compromised over time, the ways people assessed the Gold Rush's social, economic, political, and environmental impacts also changed, thus influencing the ways decisions about resource use were made.
3. Discuss immigration and migration to California between 1850 and 1900, including the diverse composition of those who came; the countries of origin and their relative locations; and conflicts and accords among the diverse groups (e.g., the 1882 Chinese Exclusion Act).	I a b; V a	• The natural resources available in California led to the establishment of communities, economies, and other social systems and made California a desirable destination for people from many countries. • The decision to migrate and the decisions the immigrants made regarding natural systems once they got to California were based on a variety of factors, many of which had origin in their particular cultures and traditions.
4. Describe rapid American immigration, internal migration, settlement, and the growth of towns and cities (e.g., Los Angeles).	I a b; II a b c d; V a	• The natural resources available in California led to the establishment of communities, economies, and other social systems that had now become "resources" themselves. Based on the character and availability of its resources, California became a desirable destination for many people. • Direct and indirect change to natural systems resulted from rapid American immigration, internal migration, settlement, and the growth of towns and cities. Immigration brought about increased population and consumption rates, changes in resource production and consumption patterns, and expansion of towns and cities. These changes influence the geographic extent, composition, biological diversity, and viability of natural systems. • As rapid immigration progressed, new laws, policies and incentives were required to help govern and manage the resources and natural systems upon which the towns and cities relied.

5. Discuss the effects of the Great Depression, the Dust Bowl, and World War II on California.	I a b ; II a b c d; III b c; IV a b c; V a b	• The Great Depression, the Dust Bowl, and World War II all increased awareness of the value of California's natural resources (goods and ecosystem services). People migrated to California and communities grew in certain parts of the state in order to take direct advantage of the space, climate, and resources available. • As the population grew, so did human communities, and their resource supply and consumption patterns, the way they were operated, and their laws, policies and incentives regarding the use and management of natural systems all changed. The effect on the natural systems in California was lasting and permanent. • Humans depend on the cycles that are part of natural systems because they in part determine the goods and services available for human use. Human practices can alter the cycles operating within natural systems, sometimes with catastrophic effects as evidenced by the Dust Bowl. • The quantities of resources consumed without regard to future consequences contributed to both the Great Depression and the Dust Bowl. The impacts of overconsumption are felt beyond the immediate range of natural systems. • The byproducts of weapon production/use and other industries that arose during World War II have had lasting effects on California's natural systems. These byproducts are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effects. • The capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity and the nature of its byproducts. The effects of the "temporary" internment camps (e.g., Manzanar) and migrant work camps (e.g., to house Dust Bowl migrants) remain visible on California's landscape after many decades. • Decisions by individuals and communities to come to California during these times to take advantage of the resources and natural systems were based on many factors. During these events in history, the ways in which humans acted upon the natural systems changed in response to changes in the health of natural and social systems.
6. Describe the development and locations of new industries since the turn of the century, such as the aerospace industry, electronics industry, large-scale commercial agriculture and irrigation projects, the oil and automobile industries, communications and defense industries, and important trade links with the Pacific Basin.	I a b; II a b c d; III b c; IV a b c; V a b	• California's natural resources (goods and services) were valuable to human individuals and communities as scientific discoveries gave rise to new industries. People migrated to California and the communities in certain parts of the state grew in order to take direct advantage of the space, climate, and resources available. • As the population grew, so did human communities, and their resource supply and consumption patterns, the way they were operated, and their laws, policies and incentives regarding the use and management of natural systems all changed. The effect of all this on the natural systems in California was lasting and permanent. • Humans depend on the cycles that are part of natural systems because they in part determine the goods and ecosystem services available for human use. Human practices can alter the cycles and processes operating within natural systems. • The effects of new industries on natural systems are directly related to the quantities of resources consumed and the quantity and characteristics of the resulting byproducts. • The byproducts of new industries—which are often more concentrated and more toxic than byproducts of older industries—are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effects. • The capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity and the nature of its byproducts. With the rise of California's newer industries, all of these factors became more pronounced. • Decisions about resources and natural systems are complex and based on a spectrum of considerations that include legal factors, economic factors, environmental sustainability, public health, and socio-cultural factors. The ways people assess these factors have changed over time in response to changing conditions, which influences how decisions are made.

7. Trace the evolution of California's water system into a network of dams, aqueducts, and reservoirs.	I a b c; II a b c d; III a b c; V a b	• California's water (goods and services) has always been valuable to human individuals and communities. People migrated to California and the communities became established in certain parts of the state in order to take direct advantage of the water resources available. • The health of natural systems directly affects the quality, quantity, and reliability of the goods and ecosystem services provided by natural systems. California's water system evolved, and enhanced the reliability and quantity of water resources available for human use. • The capacity of natural systems to adjust to human-caused alterations depends on the scope, scale, and duration of the activity and the nature of its byproducts. The effects of water transfers across California (e.g., Owens River, California Aqueduct) remain visible on California's landscape (e.g., Owens Valley and Mono Lake). • As California's population grew, so did the need for increased water supplies. California's water system evolved in response. Building a network of dams, aqueducts, and reservoirs has influenced and continues to influence the geographic extent, composition, biological diversity, and viability of natural systems. • The water cycle is essential to the function of natural systems. Humans depend on the water cycle, and on the availability of adequate quantities and quality of water supplies for survival, as well as for the many agricultural and industrial activities. Human practices, such as the building of dams, aqueducts, and reservoirs, can drastically alter the water cycles and processes operating within natural systems. • Decisions about developing water resources are complex and influenced by a spectrum of considerations that include legal factors, economic factors, environmental sustainability, public health, and socio-cultural factors. The ways in which people assess these factors have changed over time in response to changing conditions, which influences how those decisions are made.
8. Describe the history and development of California's public education system, including universities and community colleges.		
9. Analyze the impact of twentieth-century Californians on the nation's artistic and cultural development, including the rise of the entertainment industry (e.g., Louis B. Meyer, Walt Disney, John Steinbeck, Ansel Adams, Dorothea Lange, John Wayne).	II a b c; II d; VI a b c; V a	• Southern California's resources and natural systems have been impacted by the population and community growth related to the establishment of the entertainment industry. The natural resource consumption patterns of that industry and the surrounding communities have had effects on the natural systems in southern California. • The contributions of artists, writers, film producers, such as John Steinbeck and Ansel Adams, and their depictions of natural systems, influence decisions about resources and natural systems. • The pursuit of recreation has influenced the geographic extent, composition, biological diversity, and viability of natural systems (e.g., park development, trail use, off-road vehicles) and called for new laws, regulations, and policies.

5. Students understand the structures, functions, and powers of the local, state, and federal governments as described in the U.S. Constitution.		
1. Discuss what the U.S. Constitution is and why it is important (i.e., a written document that defines the structure and purpose of the U.S. government and describes the shared powers of federal, state, and local governments).		
2. Understand the purpose of the California Constitution, its key principles, and its relationship to the U.S. Constitution.		

3. Describe the similarities (e.g., written documents, rule of law, consent of the governed, three separate branches) and differences (e.g., scope of jurisdiction, limits on government powers, use of the military) among federal, state, and local governments.	II d; V a b	• Similarities in federal, state, and local governments (e.g., written documents, rule of law, consent of the governed, three separate branches) and differences (e.g., scope of jurisdiction and use of power) result in laws, regulations, policies, and incentives that govern the use, management, and consumption of resources. • Laws that influence decisions about resources and natural system grow from a spectrum of considerations. • The use of these powers influences the geographic extent, composition, biological diversity, and viability of natural systems.
4. Explain the structures and functions of state governments, including the roles and responsibilities of their elected officials.	II d; V a	• State governments create and enforce laws, regulations, and policies regarding the use and management of natural systems. • Laws that influence decisions about resources and natural system grow from a spectrum of considerations. • The use of these powers influences the geographic extent, composition, biological diversity, and viability of natural systems.
5. Describe the components of California's governance structure (e.g., cities and towns, Indian rancherias and reservations, counties, school districts).	II d; V a	• Local governments create and enforce laws, regulations, and policies regarding the use and management of local natural systems. • Laws that influence decisions about resources and natural system grow from a spectrum of considerations. • The use of these powers influences the geographic extent, composition, biological diversity, and viability of natural systems.

History/Social Science

Standards Alignment Map

Fifth Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students describe the major pre-Columbian settlements, including the cliff dwellers and pueblo people of the desert Southwest, the American Indians of the Pacific Northwest, the nomadic nations of the Great Plains, and the woodland peoples east of the Mississippi River.		
1. Describe how geography and climate influenced the way various nations lived and adjusted to the natural environment, including locations of villages, the distinct structures that they built, and how they obtained food, clothing, tools, and utensils.	I a b; III a b; V a	• The regions of the United States, their climates and their physical environments provided goods and ecosystem services essential to the survival of the American Indian nations. The resources available in different areas determined the lifestyles of the communities that developed in each area. Their structures, clothing, tools, utensils, and choice of foods revolved around the particular natural resources available. • Decisions that American Indians made in pre-Columbian times regarding the location of villages, the structures they built, and the methods used to obtain various goods were strongly influenced by the health and viability of natural systems. • In pre-Columbian times, different priorities were placed on the factors that influence decisions about resource use and natural systems. • Pre-Columbian peoples had the same needs as we do today (e.g., water, food, shelter) even though we often meet some of those needs in different ways. • At times, ancient cultures moved the location of their villages in response to changes in the local environment.
2. Describe their varied customs and folklore traditions.	I a b; III a b; V a	• The regions of the United States, their climates and their physical environments provided goods and ecosystem services essential to the survival of the Native American nations. The resources available in different areas determined the type of cultures that developed in each area. • Customs and folklore traditions varied according to the natural system and the available resources and natural cycles experienced by a particular nation. • Native Americans depended directly on natural systems for food, water, shelter, and all other goods. Their religions often reflected an understanding of this close relationship with nature.
3. Explain their varied economies and systems of government.	I a b; V a b	• The regions of the United States, their climates and their physical environments provided goods and ecosystem services essential to the survival of the Native American nations. The resources available in different areas determined the type of economy and government that developed in each area. • The economies of American Indians in pre-Columbian times were based on availability and trade of natural resources. • Trade routes were established in order for American Indians to exchange resources. • The systems of government among American Indian nations varied. These government systems were instrumental in determining how decisions about resource use and the treatment of natural systems were made. • The ways in which social, economic, political, and environmental factors are assessed have changed over time. Current decision-making practices are not as closely linked to resource availability and use as they were in pre-Columbian times. • Native American systems of government had the same goals as current systems of government —enabling the society to survive. Survival of a society depends on, among other things, appropriate use of resources.

2. Students trace the routes of early explorers and describe the early explorations of the Americas.		
1. Describe the entrepreneurial characteristics of early explorers (e.g., Christopher Columbus, Francisco Vásquez de Coronado) and the technological developments that made sea exploration by latitude and longitude possible (e.g., compass, sextant, astrolabe, seaworthy ships, chronometers, gunpowder).	I a b; II a b c; IV a; V a	• The entrepreneurial drive motivating early exploration was based largely on the pursuit of the goods and ecosystem services provided by natural systems. Such drive was created because the population of Europe was increasing while resources were becoming less abundant. • The growing population in Europe gave rise to exploration for new sources of the goods and ecosystem services derived from natural systems. • The transportation routes, trails and roadways used by these explorers had direct and indirect influences on the natural systems where they were located.
2. Explain the aims, obstacles, and accomplishments of the explorers, sponsors, and leaders of key European expeditions and the reasons Europeans chose to explore and colonize the world (e.g., the Spanish Reconquista, the Protestant Reformation, the Counter Reformation).	I a b; II a b c; III b; V a	• The explorers, sponsors, and leaders of the European expeditions were motivated by the natural resources (goods and ecosystem services) available in other parts of the world. • Technological development gave rise to the possibility of sea exploration, which opened new opportunities for exploration. • Decisions to explore and colonize other parts of the world in order to take advantage of the natural resources there were based on a variety of needs and made possible by other natural system services including ocean currents, wind patterns and climate. • The natural systems and the associated cycles and processes sometimes acted as obstacles to the exploration and colonization of the world (e.g., Magellan, Shackleton). • The exploration of the world resulted in a variety of direct and indirect effects on natural systems and the resources they provide (e.g., exposing indigenous peoples to diseases; extermination of species).
3. Trace the routes of the major land explorers of the United States, the distances traveled by explorers, and the Atlantic trade routes that linked Africa, the West Indies, the British colonies, and Europe.	I a b; III b; V a	• The climate and physical geography of the natural systems in North America made it possible for major routes of exploration to be established. The ecosystem services provided by natural systems in the form of ocean currents, wind patterns and climate were factors that established trade routes between among the continents. The goods and services provided by the natural systems on each continent became the basis for European and American economies. • The distances traveled by explorers were closely linked to cycles and processes operating within natural systems such as wind patterns, ocean currents and climate. • Decisions to explore and colonize other parts of the world in order to take advantage of the natural resources there were based on a variety of economic, social and political factors.
4. Locate on maps of North and South America land claimed by Spain, France, England, Portugal, the Netherlands, Sweden, & Russia.		

3. Students describe the cooperation and conflict that existed among the American Indians and between the Indian nations and the new settlers.		
1. Describe the competition among the English, French, Spanish, Dutch, and Indian nations for control of North America.	I a b; II b; III a; V a	• The climate and physical geography of the natural systems in North America made it possible for major routes of exploration to be established. The ecosystem services provided by natural systems in the form of ocean currents, wind patterns and climate were factors that established trade routes between and among the continents. The goods and ecosystem services provided by the natural systems in North America, already being used by Native American nations, became increasingly important to the European economies. Control of North American goods and services became a cause for competition. • European use of resources such as the furs was in conflict with the resource consumption patterns already in place by American Indian nations. • Decisions to explore and colonize North America in order to take advantage of the natural resources there were based on a variety of needs and made possible by other natural system services and resources.

2. Describe the cooperation that existed between the colonists and Indians during the 1600s and 1700s (e.g., in agriculture, the fur trade, military alliances, treaties, cultural interchanges).	I a b; II a b c d; V a	• The goods and ecosystem services provided by the natural systems in North America, already being used by American Indian nations, became increasingly important to the European economies, and attractive to colonists who came to settle in North America. • Populations of colonists and the growth of their settlements had an effect on the natural systems that the Native American nations also relied upon for goods and ecosystem services. The methods of resource supply and consumption rates differed between the cultures; and affected natural systems. The laws, policies, and incentives they developed regarding use and management of the natural resources around them also influenced the viability of natural systems. • The colonists' decisions to cooperate with the American Indian nations in order to take advantage of the region's natural resources were motivated by need and influenced by a wide spectrum of factors.
3. Examine the conflicts before the Revolutionary War (e.g., the Pequot and King Philip's Wars in New England, the Powhatan Wars in Virginia, the French and Indian War).		
4. Discuss the role of broken treaties and massacres and the factors that led to the Indians defeat, including the resistance of Indian nations to encroachments and assimilation (e.g., the story of the Trail of Tears).	I a b; II a b c d; V a b	• The goods and ecosystem services provided by the natural systems in North America, already used by American Indian nations, became increasingly attractive to colonists who came to North America. This ultimately led to conflicts with American Indian nations over land and resources. • Populations of colonists and the growth of their settlements had an effect on the natural systems that the American Indians also relied upon for goods and ecosystem services. The methods of resource supply and consumption rates of the colonists had impacts on the natural systems, as did the operation of their settlements. The colonists' practices regarding natural resources often conflicted with practices put in place by American Indians. • Laws and treaties between the European settlers and the American Indian nations were designed to settle conflicts between populations and preserve the natural and cultural resources upon which all populations relied. • Broken treaties and massacres of American Indians were the outcomes of decisions based largely on economic and socio-cultural factors. The ways in which these factors are assessed have changed over time and are not considered acceptable today.
5. Describe the internecine Indian conflicts, including the competing claims for control of lands (e.g., actions of the Iroquois, Huron, Lakota [Sioux]).	I a b; II a b c d; V a	• Native American nations depended on the goods and ecosystem services of their regions and competed with other nations over land and resources in limited supply. • The growth of settlements by populations of colonists encroached on the natural systems upon which Native American nations relied, thereby spawning internecine conflicts among these groups for control of lands. The methods of resource supply and consumption rates of the colonists had impacts on the natural systems, as did the operation of their settlements and the laws, policies, and incentives they developed regarding the use and management of the natural resources around them. • Decisions by certain Native American nations to limit access to the region's natural resources to other Native American nations were based on each nation's needs and relationship with colonists.
6. Explain the influence and achievements of significant leaders of the time (e.g., John Marshall, Andrew Jackson, Chief Tecumseh, Chief Logan, Chief John Ross, Sequoyah).	II d; V a	• Laws, policies, and incentives regarding the use and management of natural resources and systems came about during this time because of the influence of certain individuals (e.g., Chief Justice John Marshall and his stand on concept of sovereignty; Andrew Jackson and the Indian Removal Bill that resulted in the removal of the Cherokees (Chief John Ross) from their land and resources). • Native Americans, such as Chief Tecumseh, claimed the land as their natural heritage and right and believed that Native Americans should unite under this claim.

4. Students understand the political, religious, social, and economic institutions that evolved in the colonial era.		
1. Understand the influence of location and physical setting on the founding of the original 13 colonies, and identify on a map the locations of the colonies and of the American Indian nations already inhabiting these areas.	I a b; V a	• The physical geography and the resources (goods and ecosystem services) on the eastern seaboard of North America made colonization attractive and settlement possible. • Decisions to locate and develop settlements were strongly influenced by the natural resources available in specific locations and physical settings. • As populations increased, more resources were needed. The availability of land to the west enabled the populations to continue to increase and expand territory. As the best land was claimed or taken from the Native Americans, less desirable land was settled.
2. Identify the major individuals and groups responsible for the founding of the various colonies and the reasons for their founding (e.g., John Smith, Virginia; Roger Williams, Rhode Island; William Penn, Pennsylvania; Lord Baltimore, Maryland; William Bradford, Plymouth; John Winthrop, Massachusetts).	I a b; V a	• Components of the natural environment were of particular importance to the individuals and groups who founded the various colonies and therefore had an influence on the location and development of settlements were established.
3. Describe the religious aspects of the earliest colonies (e.g., Puritanism in Massachusetts, Anglicanism in Virginia, Catholicism in Maryland, Quakerism in Pennsylvania).		
4. Identify the significance and leaders of the First Great Awakening, which marked a shift in religious ideas, practices, and allegiances in the colonial period, the growth of religious toleration, and free exercise of religion.		
5. Understand how the British colonial period created the basis for the development of political self-government and a free-market economic system and the differences between the British, Spanish, and French colonial systems.	II a b c d; V a	• As the populations grew and the colonies expanded, their methods of resource supply changed and consumption rates increased. • As the free-market idea became popular, the operation of the settlements and towns began to support it, and laws, policies and incentives were offered to ensure its existence as an established social system. These developments had lasting effects on natural systems. • Decisions regarding the use of natural systems and resources were beginning to be based on sustaining a free-market system (e.g., tobacco crop, shipbuilding and mercantilism). • One reason political self-government was established was to provide the means for making decisions about resources and natural systems.
6. Describe the introduction of slavery into America, the responses of slave families to their condition, the ongoing struggle between proponents and opponents of slavery, and the gradual institutionalization of slavery in the South.	V a b	• Slavery was instituted to increase the profits from harvesting resources, including agricultural crops and minerals (as not all slaves were farm workers, some worked in mines). As populations increased, the demand for resources increased.
7. Explain the early democratic ideas and practices that emerged during the colonial period, including the significance of representative assemblies and town meetings.	V b	• Representative assemblies and town meetings became established as the accepted means of making community decisions, including those regarding the management of resources and natural systems.

5. Students explain the causes of the American Revolution.		
1. Understand how political, religious, and economic ideas and interests brought about the Revolution (e.g., resistance to imperial policy, the Stamp Act, the Townshend Acts, taxes on tea, Coercive Acts).		
2. Know the significance of the first and second Continental Congresses and of the Committees of Correspondence.		

3. Understand the people and events associated with the drafting and signing of the Declaration of Independence and the document's significance, including the key political concepts it embodies, the origins of those concepts, and its role in severing ties with Great Britain.		
4. Describe the views, lives, and impact of key individuals during this period (e.g., King George III, Patrick Henry, Thomas Jefferson, George Washington, Benjamin Franklin, John Adams).		

6. Students understand the course and consequences of the American Revolution.		
1. Identify and map the major military battles, campaigns, and turning points of the Revolutionary War, the roles of the American and British leaders, and the Indian leaders' alliances on both sides.		
2. Describe the contributions of France and other nations and of individuals to the out-come of the Revolution (e.g., Benjamin Franklin's negotiations with the French, the French navy, the Treaty of Paris, The Netherlands, Russia, the Marquis Marie Joseph de Lafayette, Tadeusz Ko´sciuszko, Baron Friedrich Wilhelm von Steuben).		
3. Identify the different roles women played during the Revolution (e.g., Abigail Adams, Martha Washington, Molly Pitcher, Phyllis Wheatley, Mercy Otis Warren).		
4. Understand the personal impact and economic hardship of the war on families, problems of financing the war, wartime inflation, and laws against hoarding goods and materials and profiteering.		
5. Explain how state constitutions that were established after 1776 embodied the ideals of the American Revolution and helped serve as models for the U.S. Constitution.		
6. Demonstrate knowledge of the significance of land policies developed under the Continental Congress (e.g., sale of western lands, the Northwest Ordinance of 1787) and those policies' impact on American Indians' land.	I a b; II a b c d; V a	• The resources (goods and ecosystem services) provided by the natural systems in these regions were attractive to settlers, and were already being used by the Native American nations established there. • The sale of western lands brought population growth, changes in resource supply methods and consumption rates and the expansion western communities. The laws, policies, and incentives developed to bring settlers to these regions and to remove Native American peoples had lasting effects on the natural systems. • Land policies developed under the Continental Congress influenced decisions made about resources and natural systems. • Population growth in the east created the need to expand westward as the eastern resources were claimed or used. The sale of western lands brought population growth to the west.
7. Understand how the ideals set forth in the Declaration of Independence changed the way people viewed slavery.		

7. Students describe the people and events associated with the development of the U.S. Constitution and analyze the Constitution's significance as the foundation of the American republic.		
1. List the shortcomings of the Articles of Confederation as set forth by their critics.		
2. Explain the significance of the new Constitution of 1787, including the struggles over its ratification and the reasons for the addition of the Bill of Rights.		

3. Understand the fundamental principles of American constitutional democracy, including how the government derives its power from the people and the primacy of individual liberty.	V a b	• The idea of individual liberty influences decisions about natural systems, and the supply and consumption of natural resources. • The principles of American constitutional democracy dictate how decisions about resources and natural systems are made.
4. Understand how the Constitution is designed to secure our liberty by both empowering and limiting central government and compare the powers granted to citizens, Congress, the president, and the Supreme Court with those reserved to the states.	V b	• Decisions about natural systems and resources are made in accordance with the Constitution and the powers it grants to citizens, states, Congress, the president, and the Supreme Court.
5. Discuss the meaning of the American creed that calls on citizens to safeguard the liberty of individual Americans within a unified nation, to respect the rule of law, and to preserve the Constitution.	V a	• Once national decisions (laws, policies, resolutions) are made, citizens are called on to respect the rule of law, putting it above individual liberty and private property. This recognition influences decisions individuals may make regarding natural resources and systems.
6. Know the songs that express American ideals (e.g., "America the Beautiful," "The Star Spangled Banner").		

8. Students trace the colonization, immigration, and settlement patterns of the American people from 1789 to the mid-1800s, with emphasis on the role of economic incentives, effects of the physical and political geography, and transportation systems.		
1. Discuss the waves of immigrants from Europe between 1789 and 1850 and their modes of transportation into the Ohio and Mississippi Valleys and through the Cumberland Gap (e.g., overland wagons, canals, flatboats, steamboats).	I a b; II a b c d; III b; V a	• The natural resources available in the American territories led to the establishment of communities, economies, and other social systems in the interior of the nation that became “resources” themselves. • As immigration from Europe caused populations and communities to grow, resource supply methods and consumption rates changed to meet the needs of the growing populations and communities. The operation of towns changed as they grew, significantly affecting the natural resources and systems around them. Laws, policies and incentives were developed to help govern and manage the resources and natural systems upon which towns and cities relied. • The modes of transportation used by immigrants to travel into the Ohio and Mississippi Valleys often took advantage of cycles operating within natural systems. • Decisions to migrate and settle in a particular area were influenced by a variety of factors, including the availability of resources and the character of the region’s natural systems. • As populations began to exceed the carrying capacity of local natural systems, people settled other areas. As the most desirable areas became fully settled, less desirable areas were settled.
2. Name the states and territories that existed in 1850 and identify their locations and major geographical features (e.g., mountain ranges, principal rivers, dominant plant regions).	I a	• The geographic features of these states and territories were goods produced by natural systems. • Major cities were and still are typically located on natural waterways.
3. Demonstrate knowledge of the explorations of the trans-Mississippi West following the Louisiana Purchase (e.g., Meriwether Lewis and William Clark, Zebulon Pike, John Fremont).	I a b	• The explorations of the trans-Mississippi West were initiated to identify and catalogue the resources (goods and ecosystem services) available west of the Missouri river.

4. Discuss the experiences of settlers on the overland trails to the West (e.g., location of the routes; purpose of the journeys; the influence of the terrain, rivers, vegetation, and climate; life in the territories at the end of these trails).	I a b; II a b c d; III b; V a	• The natural resources available west of the Mississippi and Missouri Rivers and in the American territories led to the establishment of communities, economies, and other social systems in the interior of the nation that then became "resources" themselves. The natural resources and systems in the territories and along the migration routes made migration to the West both possible and challenging. • As immigration from Europe caused populations and communities on the eastern seaboard to grow, resource production methods and consumption rates changed to meet the needs of the growing populations. The operation of towns changed as they grew, influencing natural resources and systems around them. Laws, policies and incentives were developed to govern and manage the resources and natural systems upon which the communities relied. • Humans depend on the cycles and processes that operate within natural systems because they in part determine the goods and ecosystem services available for use. • Decisions to migrate and to settle in a particular area were influenced by a variety of factors, including the availability of resources and the character of the region's natural systems.
5. Describe the continued migration of Mexican settlers into Mexican territories of the West and Southwest.	I a b; V a	• The natural resources available in the West and Southwest lands of North America led to the establishment of communities, economies, and other social systems that became "resources" themselves. • The natural resources and systems in the territories and along the migration routes made migration to the West both possible and challenging. • Decisions to migrate and settle in a particular area were influenced by a variety of factors, including the availability of resources and the character of the region's natural systems.
6. Relate how and when California, Texas, Oregon, and other western lands became part of the United States, including the significance of the Texas War for Independence and the Mexican-American War.	I a b; V a	• The western lands that later became California, Texas, Oregon, and other western states offered goods and ecosystem services important to the growing population of the country. • The decision to go to war over the acquisition of western lands was influenced by the resources available in those regions along with other factors.

9. Students know the location of the current 50 states and the names of their capitals.

History/Social Science

Standards Alignment Map

Sixth Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students describe what is known through archaeological studies of the early physical and cultural development of humankind from the Paleolithic era to the agricultural revolution.		
1. Describe the hunter-gatherer societies, including the development of tools and the use of fire.	I a b; II a c	• The hunter-gatherer societies' survival depended upon their knowledge of natural systems and their use of the resources to develop tools and use fire. • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • The expansion and operation of hunter-gatherer societies influenced the geographic extent, composition, biological diversity, and viability of natural systems.
2. Identify the locations of human communities that populated the major regions of the world and describe how humans adapted to a variety of environments.	I a b; II b; III b; V a	• During the Paleolithic era, humans populated a variety of areas in the world in which resources were available that made settlement possible. • The methods used to extract, harvest, transport and consume natural resources varied among early human communities. • The practices of humans from the Paleolithic era depended upon and benefited from the cycles and processes that operate within natural systems. • Natural systems provide resources (goods and ecosystem services) upon which humans depend. • Decisions made by humans to settle and adapt to a variety of environments were based upon many factors.
3. Discuss the climatic changes and human modifications of the physical environment that gave rise to the domestication of plants and animals and new sources of clothing and shelter.	I a b; II a b c; III a b; IV a; V a b	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. As the climate warmed, more resources became available for human use. • As the climate warmed and the environment changed, human populations moved into new areas. • New natural resources became available, and the extraction methods and consumption rates of humans changed as a result. • The operation of their communities also had effects on the natural systems. • Humans depend upon the cycles that are part of natural systems. • Humans can alter these cycles as they meet their needs. • As the environment changed and the quantity of the resources consumed by human communities increased, the resource supply methods changed (e.g., agriculture and ranching, textiles, cooking and preserving food, work specialization), and the byproducts of these practices affected the natural systems. • Decisions about supply and consumption of natural resources in early civilizations were made based on a limited number of factors—mostly availability or accessibility, and usefulness. Practices in early civilizations affected natural systems such that the civilizations changed their behaviors in order to preserve the natural systems and thereby their social systems.

2. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Mesopotamia, Egypt, and Kush.		
1. Locate and describe the major river systems and discuss the physical settings that supported permanent settlement and early civilizations.	I a b; II a b c d; III b; IV a c; V a	• River systems and other geographical features were resources (goods and ecosystem services) that humans relied upon to support permanent settlement and early civilizations. • Humans depend upon the cycles that are part of natural systems. • Decisions to settle in certain areas were based upon the resources available there for use by the human community.

2. Trace the development of agricultural techniques that permitted the production of economic surplus and the emergence of cities as centers of culture and power.	I a b; II a b c; III b c; IV a; V a b	• As humans learned more about natural systems, resources and cycles, they applied their knowledge to the development of agricultural techniques that resulted in harvesting more resources (food). • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Surplus of resources led to population growth and changes in the natural resource supply methods and consumption rates of humans as more and different resources were used by human populations. • The expansion and operation of the growing and changing communities also had effects on the natural systems. • Humans depend upon the cycles that are part of natural systems. • Humans can alter these cycles as they meet their needs. • As the quantity of the resources consumed by human communities increased, the resource supply, extraction methods, consumption patterns, etc. in the communities changed (e.g., agriculture, ranching, textile practices, cooking and preserving food, work specialization). The byproducts of these methods and the increased rates of consumption affected the natural systems. • Decisions about supply and consumption of natural resources in early civilizations were made based on a limited number of factors—mostly availability, accessibility, and usefulness. • Civilizations changed their behaviors in order to preserve the natural systems that were supplying them with resources, thereby preserving their own social systems. • As people settled in cities and the cities grew, they needed to import agricultural products such as food from farther and farther away.
3. Understand the relationship between religion and the social and political order in Mesopotamia and Egypt.	V a	• Many religious beliefs were related to natural phenomena such as the flooding of rivers.
4. Know the significance of Hammurabi's Code.	II d; V a b	• Hammurabi's Code set up laws for early civilizations to govern themselves once people started living in communities. Hammurabi's Code was the first (known) attempt to standardize decision-making about resources as private property. • The consequences outlined in the Code influenced actions of individuals in regards to use (or misuse) of resources.
5. Discuss the main features of Egyptian art and architecture.	III b; V a	• Egyptian art shows the culture's dependence on natural cycles such as the flooding of the Nile, and appreciation for animals.
6. Describe the role of Egyptian trade in the eastern Mediterranean and Nile Valley.	I a b; II a b c d; III b; V a b	• The Nile River and Valley provided the resources necessary to establish an agricultural economy. • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • The natural resource supply methods and consumption patterns in Egypt were such that a surplus of resources (e.g., food) developed. The civilization grew and expanded its borders, and resource consumption and supply patterns changed as a result. • The operation of the Egyptian Empire was designed to make the most of the resources in the Nile Valley. This affected the natural systems of the valley in turn. Laws, policies, and incentives were created to govern the use and management of the natural systems and resources of the Nile Valley in order to sustain the civilization. • Humans depend upon the cycles that are part of natural systems.
7. Understand the significance of Queen Hatshepsut and Ramses the Great.		
8. Identify the location of the Kush civilization and describe its political, commercial, and cultural relations with Egypt.	I a b; II b c d; V a b	• The Nile River and Valley provided the resources necessary to establish an agricultural economy. • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Because of Kush's location near the headwaters of the Nile River, its resource supply methods, consumption patterns and operations were similar to those of Egypt. • It became a policy for each Egyptian dynasty to control Kush to ensure access to the river's resources.
9. Trace the evolution of language and its written forms.		

3. Students analyze the geographic, political, economic, religious, and social structures of the Ancient Hebrews.		
1. Describe the origins and significance of Judaism as the first monotheistic religion based on the concept of one God who sets down moral laws for humanity.		
2. Identify the sources of the ethical teachings and central beliefs of Judaism (the Hebrew Bible, the Commentaries): belief in God, observance of law, practice of the concepts of righteousness and justice, and importance of study; and describe how the ideas of the Hebrew traditions are reflected in the moral and ethical traditions of Western civilization.		
3. Explain the significance of Abraham, Moses, Naomi, Ruth, David, and Yohanan ben Zaccai in the development of the Jewish religion.		
4. Discuss the locations of the settlements and movements of Hebrew peoples, including the Exodus and their movement to and from Egypt, and outline the significance of the Exodus to the Jewish and other people.	I a b	• Explorers traveled to new areas seeking the goods and ecosystem services provided by the natural systems in different regions.
5. Discuss how Judaism survived and developed despite the continuing dispersion of much of the Jewish population from Jerusalem and the rest of Israel after the destruction of the second Temple in A.D. 70.		

4. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Ancient Greece.		
1. Discuss the connections between geography and the development of city-states in the region of the Aegean Sea, including patterns of trade and commerce among Greek city-states and within the wider Mediterranean region.	I a b; II b c; IV a c; V b	• The Aegean Sea and its surrounding region provided the resources necessary to found an economy based on trade. • The natural systems of the region provided the resources (goods and ecosystem services) upon which civilizations relied. • The regularity of resource surpluses in civilizations around the Aegean Sea became the basis of a trade economy throughout the entire Mediterranean. • The operation of the Greek city-states was based upon ensuring safe trade routes and accessibility of goods to consumers. These practices had effects on the natural systems of the Aegean Sea and the wider Mediterranean.
2. Trace the transition from tyranny and oligarchy to early democratic forms of government and back to dictatorship in ancient Greece, including the significance of the invention of the idea of citizenship (e.g., from *Pericles' Funeral Oration).*		
3. State the key differences between Athenian, or direct, democracy and representative democracy.		
4. Explain the significance of Greek mythology to the everyday life of people in the region and how Greek literature continues to permeate our literature and language today, drawing from Greek mythology and epics, such as Homer's *Iliad* and *Odyssey,* and from *Aesop's Fables.*		

5. Outline the founding, expansion, and political organization of the Persian Empire.	I a b; II a b c d; IV c; V a b	• The Persian Empire was sustained by the resources (goods and ecosystem services) available to humans from the natural systems in the region. However, an empire of this size soon demanded much more than the local natural systems could provide. • The empire was forced to expand to new areas with additional resources in order to meet its needs. As the empire grew, its population grew. The resource supply methods and consumption patterns of the empire affected the natural systems around and within it. The operations of the empire centered on resource acquisition and transportation and had lasting effects on the natural systems in the region. • Decisions regarding resources in the empire and expansion to meet the empire's need for resources were made by the ruling class, and were based upon their consumption needs.
6. Compare and contrast life in Athens and Sparta, with emphasis on their roles in the Persian and Peloponnesian Wars.		
7. Trace the rise of Alexander the Great and the spread of Greek culture eastward and into Egypt.	I a b; II a b c; V a b	• The empire of Alexander the Great and the spread of Greek culture were sustained by the resources (goods and ecosystem services) available to humans from the natural systems in the region. However, an empire of this size soon demanded much more than the local natural systems could provide. • The empire was forced to expand to new areas with additional resources in order to meet its needs. As the empire grew, its population grew. The resource supply methods and consumption patterns of the empire affected the natural systems around and within it. The operations of the empire centered on resource acquisition and transportation and had lasting effects on the natural systems in the region. • Decisions regarding resources in the empire and expansion to meet the empire's need for resources were made by the ruling class, and were based upon their consumption needs.
8. Describe the enduring contributions of important Greek figures in the arts and sciences (e.g., Hypatia, Socrates, Plato, Aristotle, Euclid, Thucydides).	II d; V a b	• These individuals exerted influence on decisions that were made regarding natural resources, the process of making those decisions, and the laws, regulations, policies and incentives that governed the use, management and consumption of resources at that time.

5. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of India.		
1. Locate and describe the major river system and discuss the physical setting that supported the rise of this civilization.	I a b; III b; V a b	• India's river systems and other geographical features provided resources (goods and ecosystem services) upon which early civilizations relied. • Humans depend upon the cycles and the goods and ecosystem services in an area.
2. Discuss the significance of the Aryan invasions.		
3. Explain the major beliefs and practices of Brahmanism in India and how they evolved into early Hinduism.		
4. Outline the social structure of the caste system.		
5. Know the life and moral teachings of Buddha and how Buddhism spread in India, Ceylon, and Central Asia.		
6. Describe the growth of the Maurya empire and the political and moral achievements of the emperor Asoka.		
7. Discuss important aesthetic and intellectual traditions (e.g., Sanskrit literature, including the *Bhagavad Gita;* medicine; metallurgy; and mathematics, including Hindu-Arabic numerals and the zero).		

6. Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of China.		
1. Locate and describe the origins of Chinese civilization in the Huang-He Valley during the Shang Dynasty.	I a b; II a b c; III a b c; IV a b c; V a b	• River systems and other geographical features are resources (goods and ecosystem services) upon which humans rely and that make civilization possible. • The growth of Chinese populations and communities, their resource supply methods and consumption rates, and the operation of their communities affected the natural systems in the Huang-He Valley. • Humans depend upon the cycles that are part of natural systems. • Decisions to settle in the Huang-He valley and use the river and valley's resources were based on a limited number of factors.
2. Explain the geographic features of China that made governance and the spread of ideas and goods difficult and served to isolate the country from the rest of the world.	I a b; II a b d; IV a b c; V a b	• The geography of China, while able to provide resources to sustain large communities, did not support efforts to unify the country under one ruler or efforts to share resources between regions. • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Natural resource supply methods and consumption rates in each of the regions of China affected the natural systems of each region separately. • Decisions regarding the unification of the regions of China under one government and the settlement of new areas in China were based on a limited number of factors, including resource use.
3. Know about the life of Confucius and the fundamental teachings of Confucianism and Taoism.		
4. Identify the political and cultural problems prevalent in the time of Confucius and how he sought to solve them.		
5. List the policies and achievements of the emperor Shi Huangdi in unifying northern China under the Qin Dynasty.		
6. Detail the political contributions of the Han Dynasty to the development of the imperial bureaucratic state and the expansion of the empire.	I a b; II a b c d; IV c; V a b	• The geography of China, while able to provide resources to sustain large communities, did not support efforts to unify the country under one ruler, or efforts to share resources between regions. • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Forced immigration to open areas and extensive record keeping and cataloging of the natural resources prompted increased population and growth of towns in areas of China. Natural resource supply methods and consumption rates, the operation of communities, and laws, policies and incentives regarding the use and management of natural systems all had effects on the natural systems.
7. Cite the significance of the trans-Eurasian "silk roads" in the period of the Han Dynasty and Roman Empire and their locations.	I a b c; II a b c; III b; IV a	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. The silk worm and the natural goods and ecosystem services it provided were not overlooked by members of certain Chinese communities or its rulers. • The economy that developed around the production of silk as a raw good, the creation of the textile, and the safe transportation and the distribution of materials (raw and finished) were supported and encouraged to expand. • As populations increase, there is increased competition for resources. Competition for resources makes them more valuable (law of supply and demand). • The silk trade caused the growth of communities and populations in many areas of China, bringing about changes in resource supply methods and consumption rates and the operation of communities in certain regions. These changes had lasting effects on the natural systems. • Humans depend upon the cycles that are part of natural systems.
8. Describe the diffusion of Buddhism northward to China during the Han Dynasty.		

7. Students analyze the geographic, political, economic, religious, and social structures during the development of Rome.		
1. Identify the location and describe the rise of the Roman Republic, including the importance of such mythical and historical figures as Aeneas, Romulus and Remus, Cincinnatus, Julius Caesar, and Cicero.		
2. Describe the government of the Roman Republic and its significance (e.g., written constitution and tripartite government, checks and balances, civic duty).	V a b	• Decisions regarding resources in the Roman Republic and expansion to meet the Republic's need for resources were made by the ruling class, and were based upon their consumption needs. • However, individual actions and the actions of the communities far away from Rome were based on other considerations—limits, scarcity, and competition for control.
3. Identify the location of and the political and geographic reasons for the growth of Roman territories and expansion of the empire, including how the empire fostered economic growth through the use of currency and trade routes.	I a b; II a b c d; IV a b; V a b	• The Roman Empire was sustained by the resources (goods and ecosystem services) available to humans from the natural systems in the region. However, an empire of this size soon demanded much more than the local natural systems could provide. • As the Empire grew, its population grew. The resource supply methods and consumption patterns of the empire affected the natural systems around and within it. The operations of the Empire centered on resource acquisition and transportation and had lasting effects on the natural systems in the region. • The byproducts of the production and consumption of goods in the Roman Empire had lasting effects on the natural systems. The byproducts of the human activities in the Empire were not readily prevented from entering natural systems and may have been beneficial, neutral or detrimental in their effects. • Decisions regarding resources in the Empire and expansion to meet the Empire's need for resources were made by the ruling class, and were based upon their consumption needs. • However, individual actions and the actions of the communities far away from Rome were based on other considerations—limits, scarcity, and competition for control.
4. Discuss the influence of Julius Caesar and Augustus in Rome's transition from republic to empire.		
5. Trace the migration of Jews around the Mediterranean region and the effects of their conflict with the Romans, including the Romans' restrictions on their right to live in Jerusalem.		
6. Note the origins of Christianity in the Jewish Messianic prophecies, the life and teachings of Jesus of Nazareth as described in the New Testament and the contribution of St. Paul the Apostle to the definition and spread of Christian beliefs (e.g., belief in the Trinity, resurrection, salvation).		
7. Describe the circumstances that led to the spread of Christianity in Europe and other Roman territories.		
8. Discuss the legacies of Roman art and architecture, technology and science, literature, language, and law.		

History/Social Science

Standards Alignment Map

Seventh Grade

DRAFT — December 1, 2004

Seventh Grade — California History/Social Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students analyze the causes and effects of the vast expansion and ultimate disintegration of the Roman Empire.		
1. Study the early strengths and lasting contributions of Rome (e.g., significance of Roman citizenship; rights under Roman law; Roman art, architecture, engineering, and philosophy; preservation and transmission of Christianity) and its ultimate internal weaknesses (e.g., rise of autonomous military powers within the empire, undermining of citizenship by the growth of corruption and slavery, lack of education, and distribution of news).		
2. Discuss the geographic borders of the empire at its height and the factors that threatened its territorial cohesion.	I a b;	• The Roman Empire spread to new areas seeking the goods and ecosystem services provided by the natural systems in those regions. • The Empire was not able to protect the farmers in the provinces, nor were the farmers able to protect themselves against barbarian invaders and farm at the same time. Ultimately, the Empire depended on the farmers and the land as even modern countries do.
3. Describe the establishment by Constantine of the new capital in Constantinople and the development of the Byzantine Empire, with an emphasis on the consequences of the development of two distinct European civilizations, Eastern Orthodox and Roman Catholic, and their two distinct views on church-state relations.	I a b;	• The Byzantine Empire spread to new areas seeking the goods and ecosystem services provided by the natural systems in the regions.
2. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Islam in the Middle Ages.		
1. Identify the physical features and describe the climate of the Arabian peninsula, its relationship to surrounding bodies of land and water, and nomadic and sedentary ways of life.	I a b; III b; IV a c	• The physical features and climate of the Arabian Peninsula and its relationship to surrounding bodies of land and water defined the establishment of communities and ways of life for the people of the region. • Natural systems provided resources (goods and ecosystem services) upon which human communities on the Arabian Peninsula relied. Their nomadic and sedentary ways of life depended on their knowledge of natural systems. • Humans depend upon the cycles that are part of natural systems.
2. Trace the origins of Islam and the life and teachings of Muhammad, including Islamic teachings on the connection with Judaism and Christianity.	I a b; III b c	• Muhammad rose to power because he and his followers took control of Mecca, an oasis located on an important trade route that linked the Mediterranean world with the Middle East. Control of natural resources enabled Muhammad and his followers to gain power.
3. Explain the significance of the Qur'an and the Sunnah as the primary sources of Islamic beliefs, practice, and law, and their influence in Muslims' daily life.		
4. Discuss the expansion of Muslim rule through military conquests and treaties, emphasizing the cultural blending within Muslim civilization and the spread and acceptance of Islam and the Arabic language.	I a b; III b c	• As Muslims conquered other peoples in other regions, they learned how to utilize the natural resources in those regions, adapt local farming techniques, and allow people to continue with practices that were successful in the local environments.

5. Describe the growth of cities and the establishment of trade routes among Asia, Africa, and Europe, the products and inventions that traveled along these routes (e.g., spices, textiles, paper, steel, new crops), and the role of merchants in Arab society.	I a b; II a b c d; III b; V a b	• Natural systems provided resources (goods and ecosystem services) upon which the human communities on the Arabian Peninsula relied. Their nomadic and sedentary ways of life depended on their knowledge of natural systems. • The populations of the Middle East grew, in large part, due to trade routes between Europe and Asia. Towns were settled along well-known routes, taking advantage of raw materials from far away places as well as the products made locally • As towns established their own resource supply methods and consumed resources, the natural systems in the area were affected. • The operation of these towns and cities, and the laws, policies and incentives that governed their resource use and management in the region all had effects on the natural systems. • Humans depend upon the cycles that are part of natural systems. • Decisions made at this time regarding resource use and were based on a variety of factors and limitations.
6. Understand the intellectual exchanges among Muslim scholars of Eurasia and Africa and the contributions Muslim scholars made to later civilizations in the areas of science, geography, mathematics, philosophy, medicine, art, and literature.	V a b	• The processes of making decisions about resources and natural systems, and the assessment of social, economic, political, and environmental factors varied among these civilizations and were shared by their scholars.

3. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of China in the Middle Ages.		
1. Describe the reunification of China under the Tang Dynasty and reasons for the spread of Buddhism in Tang China, Korea, and Japan.		
2. Describe agricultural, technological, and commercial developments during the Tang and Sung periods.	I a b; II a b c d	• Natural systems provided resources (goods and ecosystem services) upon which the human communities in Medieval China relied. • Technological advances supported improvements in agriculture and trade by making production time faster, more efficient or safer. Agriculture and trade supported technology by creating an environment for the improvement and evolution of technology. • As human communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems.
3. Analyze the influences of Confucianism and changes in Confucian thought during the Sung and Mongol periods.		
4. Understand the importance of both overland trade and maritime expeditions between China and other civilizations in the Mongol Ascendancy and Ming Dynasty.	I a b; II a b c d; III b; V a b	• Natural systems provided resources (goods and ecosystem services) upon which human communities in Medieval China relied. • Technological advances improved the time, safety, and efficiency rate of maritime expeditions and trade. Expeditions and trade supported technology by creating an environment for the improvement and evolution of technology. • As human communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend upon the cycles that are part of natural systems. • Decisions to explore, harvest and trade certain resources were based on a wide variety of factors and were made by the ruling class.

5. Trace the historic influence of such discoveries as tea, the manufacture of paper, wood-block printing, the compass, and gunpowder.	I a b; II a b c d; V a b	• Natural systems provided resources (goods and ecosystem services) upon which the human communities in Medieval China relied. • Such discoveries as tea and gunpowder, and the processes involved in their production, influenced worldwide natural resource production practices and consumption patterns. • As human communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems.
6. Describe the development of the imperial state and the scholar-official class.		

4. Students analyze the geographic, political, economic, religious, and social structures of the sub-Saharan civilizations of Ghana and Mali in Medieval Africa.		
1. Study the Niger River and the relationship of vegetation zones of forest, savannah, and desert to trade in gold, salt, food, and slaves; and the growth of the Ghana and Mali empires.	I a b; II a b c d; III b; IV b; V a	• Natural systems provided resources (goods and ecosystem services) upon which the human communities in northwestern Africa, Europe, the Middle East and North America relied. • Consumption patterns in Europe, the Middle East and North America made the African nations some of the most sought after areas for colonization. • As a result of the growth of African communities, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend upon the cycles that are part of natural systems. • The byproducts of human activities are not readily prevented from entering natural systems and may be beneficial, neutral or detrimental in their effects. • Decisions to explore, harvest and trade African resources were based on a wide variety of factors, governed by the needs of the communities and social systems in Europe, the Middle East and North America.
2. Analyze the importance of family, labor specialization, and regional commerce in the development of states and cities in West Africa.	I a b; II a b c; III c; IV a c; V a	• Natural systems provided resources (goods and ecosystem services) upon which human communities in northwestern Africa relied. • Consumption patterns in Europe, the Middle East and North America made the African nations some of the most sought after areas for colonization. • As a result of the growth of African communities, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions to explore, harvest and trade African resources were based on a wide variety of factors, governed by the needs of the communities and social systems in Europe, the Middle East and North America.
3. Describe the role of the trans-Saharan caravan trade in the changing religious and cultural characteristics of West Africa and the influence of Islamic beliefs, ethics, and law.	I a b; II a b c; III b; V a	• Natural systems provided resources (goods and ecosystem services) upon which human communities in northwestern Africa relied. • The trans-Saharan caravan trade changed the resource supply and consumption patterns of the human communities in Western Africa and other parts of the continent. The way that communities operated also changed and had effects on the surrounding natural systems. • Decisions made in Medieval Africa regarding the natural systems and resources were based on a variety of factors.
4. Trace the growth of the Arabic language in government, trade, and Islamic scholarship in West Africa.		
5. Describe the importance of written and oral traditions in the transmission of African history and culture.		

5. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Japan.		
1. Describe the significance of Japan's proximity to China and Korea and the intellectual, linguistic, religious, and philosophical influence of those countries on Japan.		
2. Discuss the reign of Prince Shotoku of Japan and the characteristics of Japanese society and family life during his reign.		
3. Describe the values, social customs, and traditions prescribed by the lord-vassal system consisting of *shogun, daimyo,* and *samurai* and the lasting influence of the warrior code in the twentieth century.		
4. Trace the development of distinctive forms of Japanese Buddhism.		
5. Study the ninth and tenth centuries' golden age of literature, art, and drama and its lasting effects on culture today, including Murasaki Shikibu's *Tale of Genji.*		
6. Analyze the rise of a military society in the late twelfth century and the role of the samurai in that society.		

6. Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Europe.		
1. Study the geography of the Europe and the Eurasian landmass, including its location, topography, waterways, vegetation, and climate and their relationship to ways of life in Medieval Europe.	I a b; II a b c d; III b; IV a c; V a b	• Natural systems and physical geography of Europe and the Eurasian landmass provided resources (goods and ecosystem services) upon which human communities relied. • As a result of the growth of African communities, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend on the cycles that are part of natural systems. • In Medieval Europe, decisions regarding the supply and use of natural resources were based on a wide variety of factors. • The assessment of social, economic, political, and environmental factors changed during Medieval European times in order to preserve the natural systems that yield goods and ecosystem services.
2. Describe the spread of Christianity north of the Alps and the roles played by the early church and by monasteries in its diffusion after the fall of the western half of the Roman Empire.	V a b	• Decisions regarding the supply and use of natural resources during this era were based on a wide variety of factors, which now included Christian ideals and beliefs.
3. Understand the development of feudalism, its role in the medieval European economy, the way in which it was influenced by physical geography (the role of the manor and the growth of towns), and how feudal relationships provided the foundation of political order.	I a b; II a b c d; IV a c; V a b	• Natural systems and physical geography of Europe and the Eurasian landmass provided resources (goods and ecosystem services) upon which human communities relied. • As feudal communities were established, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • In Medieval Europe, decisions regarding the supply and use of natural resources were based on a wide variety of factors. • The assessment of social, economic, political, and environmental factors changed during Medieval European times in order to preserve the natural systems that yield goods and ecosystem services.
4. Demonstrate an understanding of the conflict and cooperation between the Papacy and European monarchs (e.g., Charlemagne, Gregory VII, Emperor Henry IV).		

5. Know the significance of developments in medieval English legal and constitutional practices and their importance in the rise of modern democratic thought and representative institutions (e.g., Magna Carta, parliament, development of habeas corpus, an independent judiciary in England).		
6. Discuss the causes and course of the religious Crusades and their effects on the Christian, Muslim, and Jewish populations in Europe, with emphasis on the increasing contact by Europeans with cultures of the Eastern Mediterranean world.	V a b	• The Crusades changed from religious wars to wars fought to gain property and wealth.
7. Map the spread of the bubonic plague from Central Asia to China, the Middle East, and Europe and describe its impact on global population.	II a c d; III b; IV a b; V a b	• As the populations and communities of Europe grew in the wake of increased trade, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend on the cycles that are part of natural systems. • The byproducts of increased production and consumption began to have a more noticeable and cumulative effect on natural systems. The byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect. • In Medieval Europe and other regions, decisions regarding the supply and use of natural resources, waste removal and consumption patterns were based on a wide variety of factors. • The assessment of social, economic, political, and environmental factors changed during Medieval European times in order to preserve the natural systems that yield goods and ecosystem services.
8. Understand the importance of the Catholic church as a political, intellectual, and aesthetic institution (e.g., founding of universities, political and spiritual roles of the clergy, creation of monastic and mendicant religious orders, preservation of the Latin language and religious texts, St. Thomas Aquinas's synthesis of classical philosophy with Christian theology, and the concept of "natural law").	V a b	• In Medieval Europe, decisions regarding the supply and use of natural resources were based on a wide variety of factors — including Christian ideals and beliefs (natural law).
9. Know the history of the decline of Muslim rule in the Iberian Peninsula that culminated in the Reconquista and the rise of Spanish and Portuguese kingdoms.		

7. Students compare and contrast the geographic, political, economic, religious, and social structures of the Meso-American and Andean civilizations.		
1. Study the locations, landforms, and climates of Mexico, Central America, and South America and their effects on Mayan, Aztec, and Incan economies, trade, and development of urban societies.	I a b; III b; IV a c; V a	• The natural systems and physical geography of Central and South America provided resources (goods and ecosystem services) upon which both ancient human communities and urban societies relied. • Humans depend on the cycles that are part of natural systems. • In Meso-American and Andean civilizations, decisions regarding natural resource use and supply were based on a variety of factors.
2. Study the roles of people in each society, including class structures, family life, warfare, religious beliefs and practices, and slavery.		

3. Explain how and where each empire arose and how the Aztec and Incan empires were defeated by the Spanish.	I a b; III a b; IV a c; V a b	• The natural systems and physical geography Central and South America determined the location of ancient communities and provided resources (goods and ecosystem services) upon which ancient human communities relied. • Decisions regarding natural resource use and supply by the Aztecs and Incans were based on one set of needs and beliefs, while those of the Spanish were based on another set. • The introduction of European diseases played an important part in the defeat of the Aztecs and Incas. Introduction of disease-causing or other organisms can have a devastating effect on native populations of humans and other organisms.
4. Describe the artistic and oral traditions and architecture in the three civilizations.	I a	• Aztec, Inca, and Spanish architecture was based on the availability of local resources and ecosystem services.
5. Describe the Meso-American achievements in astronomy and mathematics, including the development of the calendar and the Meso-American knowledge of seasonal changes to the civilizations' agricultural systems.	I a b; III b; IV a c; V a b	• The natural systems and physical geography of Central and South America provided resources (goods and ecosystem services) upon which ancient human communities relied. • Humans depend on the cycles that are part of natural systems. • Decisions in Meso-America regarding natural resource use and supply were based on a variety of factors including extensive knowledge of the functioning of natural systems.

8. Students analyze the origins, accomplishments, and geographic diffusion of the Renaissance.		
1. Describe the way in which the revival of classical learning and the arts fostered a new interest in humanism (i.e., a balance between intellect and religious faith).	V a b	• Humanism promoted the idea that people can affect their destiny—that what we do in our lives is important and that we have a large degree of control over our futures.
2. Explain the importance of Florence in the early stages of the Renaissance and the growth of independent trading cities (e.g., Venice), with emphasis on the cities' importance in the spread of Renaissance ideas.		
3. Understand the effects of the reopening of the ancient "Silk Road" between Europe and China, including Marco Polo's travels and the location of his routes.	I a b; II a b c; V a	• The reopening of the ancient "Silk Road" between Europe and China had an impact on the natural systems of the regions. • Natural systems provide resources (goods and ecosystem services) upon which human communities rely. • As populations and communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions made during the Renaissance to explore, harvest, and trade natural resources were based upon a variety of factors.
4. Describe the growth and effects of new ways of disseminating information (e.g., the ability to manufacture paper, translation of the Bible into the vernacular, printing).		
5. Detail advances made in literature, the arts, science, mathematics, cartography, engineering, and the understanding of human anatomy and astronomy (e.g., by Dante Alighieri, Leonardo da Vinci, Michelangelo di Buonarroti Simoni, Johann Gutenberg, William Shakespeare).	V a b	• Decisions made during the Renaissance regarding natural resources and natural systems were based on personal views and beliefs. Sometimes these decisions were based on incomplete or erroneous information. Ongoing scientific discovery during this time focused on improving the base of knowledge, a process that continues today.

9. Students analyze the historical developments of the Reformation.		
1. List the causes for the internal turmoil in and weakening of the Catholic church (e.g., tax policies, selling of indulgences).		
2. Describe the theological, political, and economic ideas of the major figures during the Reformation (e.g., Desiderius Erasmus, Martin Luther, John Calvin, William Tyndale).		

3. Explain Protestants' new practices of church self-government and the influence of those practices on the development of democratic practices and ideas of federalism.		
4. Identify and locate the European regions that remained Catholic and those that became Protestant and explain how the division affected the distribution of religions in the New World.		
5. Analyze how the Counter-Reformation revitalized the Catholic church and the forces that fostered the movement (e.g., St. Ignatius of Loyola and the Jesuits, the Council of Trent).		
6. Understand the institution and impact of missionaries on Christianity and the diffusion of Christianity from Europe to other parts of the world in the medieval and early modern periods; locate missions on a world map.		
7. Describe the Golden Age of cooperation between Jews and Muslims in medieval Spain that promoted creativity in art, literature, and science, including how that cooperation was terminated by the religious persecution of individuals and groups (e.g., the Spanish Inquisition and the expulsion of Jews and Muslims from Spain in 1492).		

10. Students analyze the historical developments of the Scientific Revolution and its lasting effect on religious, political, and cultural institutions.		
1. Discuss the roots of the Scientific Revolution (e.g., Greek rationalism; Jewish, Christian, and Muslim science; Renaissance humanism; new knowledge from global exploration).		
2. Understand the significance of the new scientific theories (e.g., those of Copernicus, Galileo, Kepler, Newton) and the significance of new inventions (e.g., the telescope, microscope, thermometer, barometer).	V a b	• Decisions made during the Scientific Revolution regarding natural resources and natural systems were based on personal views and beliefs. Sometimes these decisions were based on incomplete or erroneous information. Ongoing scientific discovery during this time focused on improving the base of knowledge, a process that continues today.
3. Understand the scientific method advanced by Bacon and Descartes, the influence of new scientific rationalism on the growth of democratic ideas, and the coexistence of science with traditional religious beliefs.	V a b	• Decisions made during the Scientific Revolution regarding natural resources and natural systems were based on personal views and beliefs. Sometimes these decisions were based on incomplete or erroneous information. Ongoing scientific discovery during this time focused on improving the base of knowledge, a process that continues today.

11. Students analyze political and economic change in the sixteenth, seventeenth, and eighteenth centuries (the Age of Exploration, the Enlightenment, and the Age of Reason).		
1. Know the great voyages of discovery, the locations of the routes, and the influence of cartography in the development of a new European worldview.		

2. Discuss the exchanges of plants, animals, technology, culture, and ideas among Europe, Africa, Asia, and the Americas in the fifteenth and sixteenth centuries and the major economic and social effects on each continent.	I a b; II a b c d; III c; IV a b; V a b	• The exchanges of plants, animals, technology, culture, and ideas among Europe, Africa, Asia, and the Americas had an impact on the surrounding natural systems. • Natural systems provide resources (goods and ecosystem services) upon which human communities rely. • As populations and communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • As humans meet their needs, they can alter the cycles that are part of natural systems. • The quantity of resources consumed and the byproducts of production and consumption have an effect on natural systems. The byproducts of human activity are not readily prevented from entering systems and may be beneficial, neutral or detrimental in their effects. • Decisions made during the Age of Exploration, Age of Enlightenment and Age of Reason to explore, harvest, and trade natural resources were based upon a variety of factors. • The assessment of social, economic, political, and environmental factors changed during the fifteenth and sixteenth centuries in order to preserve the natural systems that yield goods and ecosystem services.
3. Examine the origins of modern capitalism; the influence of mercantilism and cottage industry; the elements and importance of a market economy in seventeenth-century Europe; the changing international trading and marketing patterns, including their locations on a world map; and the influence of explorers and map makers.	I a b c; II a b c d; IV a c; V a b	• Natural systems provide resources (goods and ecosystem services) upon which human communities rely. • As the populations and communities of Europe grew with the advent of mercantilism and a market economy, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions made during seventeenth Europe to explore, harvest, and trade natural resources were based upon a variety of factors. • The assessment of social, economic, political, and environmental factors changed during this time in order to preserve the natural systems that yield goods and ecosystem services.
4. Explain how the main ideas of the Enlightenment can be traced back to such movements as the Renaissance, the Reformation, and the Scientific Revolution and to the Greeks, Romans, and Christianity.	V a b	• Decisions regarding natural resources and natural systems made during this time were based on personal views and beliefs and incomplete or erroneous information. Ongoing scientific discovery during this time focused on improving the base of knowledge, a process that continues today.
5. Describe how democratic thought and institutions were influenced by Enlightenment thinkers (e.g., John Locke, Charles-Louis Montesquieu, American founders).		
6. Discuss how the principles in the Magna Carta were embodied in such documents as the English Bill of Rights and the American Declaration of Independence.		

History/Social Science

Standards Alignment Map

Eighth Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students understand the major events preceding the founding of the nation and relate their significance to the development of American constitutional democracy.		
1. Describe the relationship between the moral and political ideas of the Great Awakening and the development of revolutionary fervor.		
2. Analyze the philosophy of government expressed in the Declaration of Independence, with an emphasis on government as a means of securing individual rights (e.g., key phrases such as "all men are created equal, that they are endowed by their Creator with certain unalienable Rights").	V a b	• Socio-cultural, legal, and political factors are considered in the examination of individual rights versus the common good. Such factors are also considered in decisions regarding land ownership and resource use.
3. Analyze how the American Revolution affected other nations, especially France.		
4. Describe the nation's blend of civic republicanism, classical liberal principles, and English parliamentary traditions.		
2. Students analyze the political principles underlying the U.S. Constitution and compare the enumerated and implied powers of the federal government.		
1. Discuss the significance of the Magna Carta, the English Bill of Rights, and the Mayflower Compact.		
2. Analyze the Articles of Confederation and the Constitution and the success of each in implementing the ideals of the Declaration of Independence.		
3. Evaluate the major debates that occurred during the development of the Constitution and their ultimate resolutions in such areas as shared power among institutions, divided state-federal power, slavery, the rights of individuals and states (later addressed by the addition of the Bill of Rights), and the status of American Indian nations under the commerce clause.		
4. Describe the political philosophy underpinning the Constitution as specified in the *Federalist Papers* (authored by James Madison, Alexander Hamilton, and John Jay) and the role of such leaders as Madison, George Washington, Roger Sherman, Governor Morris, and James Wilson in the writing and ratification of the Constitution.		
5. Understand the significance of Jefferson's Statute for Religious Freedom as a forerunner of the First Amendment and the origins, purpose, and differing views of the founding fathers on the issue of the separation of church and state.		
6. Enumerate the powers of government set forth in the Constitution and the fundamental liberties ensured by the Bill of Rights.		
7. Describe the principles of federalism, dual sovereignty, separation of powers, checks and balances, the nature and purpose of majority rule, and the ways in which the American idea of constitutionalism preserves individual rights.	V a b	• Socio-cultural, legal, and political factors are reflected in Constitutional principles, including the defense of individual rights, the separation of powers, and systems of checks and balances. Such factors are also considered in decisions regarding land ownership, resource use, and the operation of human communities.

3. Students understand the foundation of the American political system and the ways in which citizens participate in it.		
1. Analyze the principles and concepts codified in state constitutions between 1777 and 1781 that created the context out of which American political institutions and ideas developed.		
2. Explain how the ordinances of 1785 and 1787 privatized national resources and transferred federally owned lands into private holdings, townships, and states.	I a b; II a b c d; IV a c; V a b	• Federal legislation such as the Ordinances of 1785 and 1787 changed land ownership, and access to and use of national resources. • Natural systems provide resources (goods and ecosystem services) upon which human communities rely. • As human communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. Decisions to offer these federal resources to private holdings, townships, and states were based on many factors including consideration of natural resources.
3. Enumerate the advantages of a common market among the states as foreseen in and protected by the Constitution's clauses on interstate commerce, common coinage, and full-faith and credit.		
4. Understand how the conflicts between Thomas Jefferson and Alexander Hamilton resulted in the emergence of two political parties (e.g., view of foreign policy, Alien and Sedition Acts, economic policy, National Bank, funding and assumption of the revolutionary debt).		
5. Know the significance of domestic resistance movements and ways in which the central government responded to such movements (e.g., Shays' Rebellion, the Whiskey Rebellion).		
6. Describe the basic law-making process and how the Constitution provides numerous opportunities for citizens to participate in the political process and to monitor and influence government (e.g., function of elections, political parties, interest groups).	V a b	• The process of making laws, including those that pertain to natural resources and natural systems, provides opportunities for citizen participation.
7. Understand the functions and responsibilities of a free press.		

4. Students analyze the aspirations and ideals of the people of the new nation.		
1. Describe the country's physical landscapes, political divisions, and territorial expansion during the terms of the first four presidents.	I a b; II a b c d; IV a c; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans rely. • As human communities grew, resource supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions made with regard to natural resource supply and consumption during the terms of the first four presidents were based on a spectrum of factors.
2. Explain the policy significance of famous speeches (e.g., Washington's Farewell Address, Jefferson's 1801 Inaugural Address, John Q. Adams's Fourth of July 1821 Address).		

3. Analyze the rise of capitalism and the economic problems and conflicts that accompanied it (e.g., Jackson's opposition to the National Bank; early decisions of the U.S. Supreme Court that reinforced the sanctity of contracts and a capitalist economic system of law).		
4. Discuss daily life, including traditions in art, music, and literature, of early national America (e.g., through writings by Washington Irving, James Fenimore Cooper).	I a b; II b c d; IV a c; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • As nineteenth century human populations grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems.

5. Students analyze U.S. foreign policy in the early Republic		
1. Understand the political and economic causes and consequences of the War of 1812 and know the major battles, leaders, and events that led to a final peace.		
2. Know the changing boundaries of the United States and describe the relationships the country had with its neighbors (current Mexico and Canada) and Europe, including the influence of the Monroe Doctrine, and how those relationships influenced westward expansion and the Mexican-American War.	I a b; II a b c d; IV a c; V a	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • As human communities grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions (e.g., going to war, negotiating boundaries) regarding natural resources influenced national behavior and foreign relations.
3. Outline the major treaties with American Indian nations during the administrations of the first four presidents and the varying outcomes of those treaties.		

6. Students analyze the divergent paths of the American people from 1800 to the mid-1800s and the challenges they faced, with emphasis on the Northeast.		
1. Discuss the influence of industrialization and technological developments on the region, including human modification of the landscape and how physical geography shaped human actions (e.g., growth of cities, deforestation, farming, mineral extraction).	I a b c; II a b c d; III b c; IV a b; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • Technological advances brought about industrialization. As human communities and industrial practices grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Industrialization influenced the health of natural systems that in turn affected the quality, quantity, and reliability of the goods and ecosystem systems provided by those systems. • Humans depend on the cycles that are part of natural systems. • Humans can alter the cycles as they meet their needs. • Industrialization brought about an increase in the quantity of resources consumed and the quantity and toxicity of byproducts from resource supply and consumption. These byproducts were not readily prevented from entering natural systems; their effects may be beneficial, neutral or detrimental to those systems. • Decisions regarding resource supply and use during the period of rising industrialization were based on many factors. The assessment of social, economic, political, and environmental factors has changed over time as a result of industrialization and the effects it had on natural systems and human societies.

2. Outline the physical obstacles to and the economic and political factors involved in building a network of roads, canals, and railroads (e.g., Henry Clay's American System).	I a b; II a b c d; III a b; IV a c; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. They also provided obstacles in building a network of roads, canals, and railroads. • Technological advances brought about industrialization, which demanded an increase in transportation options (roads, canals, railroads). • As these transportation needs were met, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend on the cycles that are part of natural systems. • Humans can alter the cycles as they meet their needs. • While decisions regarding supply and consumption of natural resources were based upon a variety of factors, the usefulness of a resource in providing a reliable supply of energy to industry was often a primary factor (e.g., cost/benefit analyses).
3. List the reasons for the wave of immigration from Northern Europe to the United States and describe the growth in the number, size, and spatial arrangements of cities (e.g., Irish immigrants and the Great Irish Famine).	I a b; II a b c d; III a c; IV a c; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • Due to changes abroad (e.g., the Great Irish Famine) in natural systems and the resources they provided, immigration from Northern Europe to the United States rates increased significantly during the nineteenth century. • Technological advances brought about industrialization, which placed a huge demand for a labor supply. This demand, along with resource scarcity in other parts of the world, resulted in waves of human migration to the United States. • As the United States population increased, new communities were established. The expansion and operation of new communities, coupled with changes in the methods used to extract, harvest, transport, and consume natural resource; the rates of consumption; and the laws, regulations, policies and incentives those communities put in place to manage the natural resources, all had lasting impacts on the surrounding natural systems. • While decisions regarding supply and consumption of natural resources were based upon a variety of factors, the usefulness of a resource for industrial production was a primary factor (e.g., cost/benefit analyses).
4. Study the lives of black Americans who gained freedom in the North and founded schools and churches to advance their rights and communities.		
5. Trace the development of the American education system from its earliest roots, including the roles of religious and private schools and Horace Mann's campaign for free public education and its assimilating role in American culture.		
6. Examine the women's suffrage movement (e.g., biographies, writings, and speeches of Elizabeth Cady Stanton, Margaret Fuller, Lucretia Mott, Susan B. Anthony).		
7. Identify common themes in American art as well as transcendentalism and individualism (e.g., writings about and by Ralph Waldo Emerson, Henry David Thoreau, Herman Melville, Louisa May Alcott, Nathaniel Hawthorne, Henry Wadsworth Longfellow).	I a b; V a b	• Artistic and literary expression during this time sought to illustrate American landscapes and recognize the resources (goods and ecosystem services) that natural systems provide. • Decisions and actions regarding natural resources and systems may have been influenced by the work of these writers and artists—some of whom were conservationists.

7. Students analyze the divergent paths of the American people in the South from 1800 to the mid-1800s and the challenges they faced.		
1. Describe the development of the agrarian economy in the South, identify the locations of the cotton-producing states, and discuss the significance of cotton and the cotton gin.	I a b; II a b c d; III b; IV a c; V a b	• The development of the agrarian economy in the South depended on the natural systems and the physical geography of the region. These natural systems provided resources (goods and ecosystem services) on which humans in the southern states came to rely. • The methods used to extract, harvest, transport, and consume natural resources in the South; the rates of consumption; the operation of agrarian communities, and the laws, regulations, policies and incentives those communities put in place to manage natural resources all had lasting impacts on the surrounding natural systems. • Decisions regarding natural resources in the South were based on a variety of factors.
2. Trace the origins and development of slavery; its effects on black Americans and on the region's political, social, religious, economic, and cultural development; and identify the strategies that were tried to both overturn and preserve it (e.g., through the writings and historical documents on Nat Turner, Denmark Vesey).		
3. Examine the characteristics of white Southern society and how the physical environment influenced events and conditions prior to the Civil War.		
4. Compare the lives of and opportunities for free blacks in the North with those of free blacks in the South.		

8. Students analyze the divergent paths of the American people in the West from 1800 to the mid-1800s and the challenges they faced.		
1. Discuss the election of Andrew Jackson as president in 1828, the importance of Jacksonian democracy, and his actions as president (e.g., the spoils system, veto of the National Bank, policy of Indian removal, opposition to the Supreme Court).		
2. Describe the purpose, challenges, and economic incentives associated with westward expansion, including the concept of Manifest Destiny (e.g., the Lewis and Clark expedition, accounts of the removal of Indians, the Cherokees' "Trail of Tears," settlement of the Great Plains) and the territorial acquisitions that spanned numerous decades.	I a b; II a b c d; IV a; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. These were important factors associated with westward expansion. • As human communities grew in the West, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • The quantity of resources consumed and the quantity of byproducts related to human consumption of resources had lasting effects on the natural systems in the United States. • Decisions regarding natural resources in the West during this time were based on a variety of factors. The assessment of social, economic, political, and environmental factors has changed over time as a result of westward expansion and the effects it had on natural systems and human societies.
3. Describe the role of pioneer women and the new status that western women achieved (e.g., Laura Ingalls Wilder, Annie Bidwell; slave women gaining freedom in the West; Wyoming granting suffrage to women in 1869).		

4. Examine the importance of the great rivers and the struggle over water rights.	I a b; II a b c d; III b c; IV a c; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • As human communities grew in the United States, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend on the cycles that are part of natural systems. • Humans can alter the cycles as they meet their needs. • Decisions regarding water resources and rights in the nation during this time were based on a variety of factors. The assessment of social, economic, political, and environmental factors has changed over time as a result of water issues and the effect such issues had on natural systems and human societies.
5. Discuss Mexican settlements and their locations, cultural traditions, attitudes toward slavery, land-grant system, and economies.	I a b; II a b c d; V a b	• Natural systems of the United States provided resources (goods and ecosystem services) upon which Mexican settlements relied. • As Mexican settlements grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions regarding natural resources and settlement during this time were based on a variety of factors.
6. Describe the Texas War for Independence and the Mexican-American War, including territorial settlements, the aftermath of the wars, and the effects the wars had on the lives of Americans, including Mexican Americans today.	I a b; II a b c d; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • As nineteenth century human populations and communities grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions regarding natural resources (going to war, negotiating political boundaries) and settlements during this time were based on a variety of factors.

9. Students analyze the early and steady attempts to abolish slavery and to realize the ideals of the Declaration of Independence.		
1. Describe the leaders of the movement (e.g., John Quincy Adams and his proposed constitutional amendment, John Brown and the armed resistance, Harriet Tubman and the Underground Railroad, Benjamin Franklin, Theodore Weld, William Lloyd Garrison, Frederick Douglass).		
2. Discuss the abolition of slavery in early state constitutions.		
3. Describe the significance of the Northwest Ordinance in education and in the banning of slavery in new states north of the Ohio River.		
4. Discuss the importance of the slavery issue as raised by the annexation of Texas and California's admission to the union as a free state under the Compromise of 1850.		
5. Analyze the significance of the States' Rights Doctrine, the Missouri Compromise (1820), the Wilmot Proviso (1846), the Compromise of 1850, Henry Clay's role in the Missouri Compromise and the Compromise of 1850, the Kansas-Nebraska Act (1854), the *Dred Scott* v. *Sandford* decision (1857), and the Lincoln-Douglas debates (1858).		

6. Describe the lives of free blacks and the laws that limited their freedom and economic opportunities.		

10. Students analyze the multiple causes, key events, and complex consequences of the Civil War.		
1. Compare the conflicting interpretations of state and federal authority as emphasized in the speeches and writings of statesmen such as Daniel Webster and John C. Calhoun.		
2. Trace the boundaries constituting the North and the South, the geographical differences between the two regions, and the differences between agrarians and industrialists.	I a b; II a b c d; IV a c; V a b	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis. • Geographic differences (e.g. latitudinal position and climate) between the North and South resulted in the provision of different goods and ecosystem services in each of these regions. • As the populations and human communities of the North and South grew in the nineteenth century, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions made by industrialists and agrarians regarding natural systems are based on similar and very different considerations.
3. Identify the constitutional issues posed by the doctrine of nullification and secession and the earliest origins of that doctrine.		
4. Discuss Abraham Lincoln's presidency and his significant writings and speeches and their relationship to the Declaration of Independence, such as his "House Divided" speech (1858), Gettysburg Address (1863), Emancipation Proclamation (1863), and inaugural addresses (1861 and 1865).		
5. Study the views and lives of leaders (e.g., Ulysses S. Grant, Jefferson Davis, Robert E. Lee) and soldiers on both sides of the war, including those of black soldiers and regiments.		
6. Describe critical developments and events in the war, including the major battles, geographical advantages and obstacles, technological advances, and General Lee's surrender at Appomattox.		
7. Explain how the war affected combatants, civilians, the physical environment, and future warfare.	I a b; II b c d; III c; IV a b c	• Natural systems and the physical geography of the United States provide resources (goods and ecosystem services) upon which humans in the past relied, and continue to rely upon, on a daily basis and, to meet military or other needs. • Humans can alter the cycles that are part of natural systems as they meet their needs. • The quantity of resources consumed and the quantity and characteristics of byproducts related to the war had lasting effects on the natural systems in the United States. The byproducts of human activity during the war were not readily prevented from entering natural systems and may have been beneficial, neutral or detrimental in their effects. • The capacity of the physical environment (natural system) to adjust to human-caused alteration due to war depends on the nature of the system, as well as the activity and nature of the byproducts of war.

11. Students analyze the character and lasting consequences of Reconstruction.		
1. List the original aims of Reconstruction and describe its effects on the political and social structures of different regions.		

2. Identify the push-pull factors in the movement of former slaves to the cities in the North and to the West and their differing experiences in those regions (e.g., the experiences of Buffalo Soldiers).		
3. Understand the effects of the Freedmen's Bureau and the restrictions placed on the rights and opportunities of freedmen, including racial segregation and "Jim Crow" laws.		
4. Trace the rise of the Ku Klux Klan and describe the Klan's effects.		
5. Understand the Thirteenth, Fourteenth, and Fifteenth Amendments to the Constitution and analyze their connection to Reconstruction.		

12. Students analyze the transformation of the American economy and the changing social and political conditions in the United States in response to the Industrial Revolution.		
1. Trace patterns of agricultural and industrial development as they relate to climate, use of natural resources, markets, and trade and locate such development on a map.	I a b; II a b c d; III b c; IV a b c; V a b	• Natural systems of the United States provided resources (goods and ecosystem services) upon which humans in industrialized or agricultural areas came to rely. • Technological advances in industry and agriculture during the late nineteenth and twentieth centuries caused changes in the populations of human communities. As the populations and human communities grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend on the cycles that are part of natural systems. • Humans can alter the cycles as they meet their needs. • Byproducts of industrial and agricultural activity are not readily prevented from entering natural systems and may be beneficial, neutral or detrimental in their effects. • Decisions regarding land use, natural resources, and industrial and agricultural activity within the United States were based on a variety of factors.
2. Identify the reasons for the development of federal Indian policy and the wars with American Indians and their relationship to agricultural development and industrialization.	I a b; II a b c d; V a b	• Natural systems of the United States provided resources (goods and ecosystem services) upon which humans in industrialized or agricultural areas came to rely. • Technological advances in industry and agriculture caused changes in the populations of human communities. As the populations and human communities grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems and on American Indian populations. • Decisions to go to war, massacre, and resettle American Indian nations were based on a variety of factors—including the desire to control natural resources to support industry and large-scale agriculture.
3. Explain how states and the federal government encouraged business expansion through tariffs, banking, land grants, and subsidies.	I a b; II d; V a b	• Natural systems of the United States provided resources (goods and ecosystem services) upon which humans in industrialized and agricultural areas came to rely. • The incentives offered by the government regarding the use and management of natural resources and systems had a lasting affect on the natural systems of the United States. • Decisions regarding natural resources and systems during this time were based on a variety of factors.

4. Discuss entrepreneurs, industrialists, and bankers in politics, commerce, and industry (e.g., Andrew Carnegie, John D. Rockefeller, Leland Stanford).	I a b; II b c; III a b c; IV a b; V a b	• The wealth of many entrepreneurs, industrialists, and bankers was derived from the discovery, extraction, harvest and consumption of natural resources. • These processes influenced the geographic extent, composition, biological diversity, and viability of natural systems.
5. Examine the location and effects of urbanization, renewed immigration, and industrialization (e.g., the effects on social fabric of cities, wealth and economic opportunity, the conservation movement).	I a b; II a b c d; III c; IV a b; V a b	• Natural systems of the United States provided resources (goods and ecosystem services) upon which humans in industrialized areas came to rely. • Industrialization caused urbanization, which led to increased populations in human communities (cities), changing the methods used to extract, harvest, transport, and consume natural resources; the rates of consumption; the operation of these communities; and the laws, regulations, policies and incentives those communities put in place to manage the natural resources. These changes all had lasting effects on the surrounding natural systems. • As they meet their needs, humans can alter the cycles that are part of natural systems. • The byproducts related to human consumption of resources in industrialized, urban areas had effects on natural systems in the United States. • These byproducts were not readily prevented from entering natural systems and were beneficial, neutral or detrimental in their effects. • Decisions regarding natural resources in the nation and the actions taken by groups and individuals in industrialized areas regarding natural systems were based on a variety of factors including concerns voiced by conservationists during this time. The conservationist movement advocated and demonstrated how human behavior had to adjust in order to conserve the natural systems upon which human communities relied.
6. Discuss child labor, working conditions, and laissez-faire policies toward big business and examine the labor movement, including its leaders (e.g., Samuel Gompers), its demand for collective bargaining, and its strikes and protests over labor conditions.		
7. Identify the new sources of large-scale immigration and the contributions of immigrants to the building of cities and the economy; explain the ways in which new social and economic patterns encouraged assimilation of newcomers into the mainstream amidst growing cultural diversity; and discuss the new wave of nativism.		
8. Identify the characteristics and impact of Grangerism and Populism.	V a	• Decisions regarding natural resources and systems were influenced by Granger and Populist groups during this time.
9. Name the significant inventors and their inventions and identify how they improved the quality of life (e.g., Thomas Edison, Alexander Graham Bell, Orville and Wilbur Wright).		

History/Social Science

Standards Alignment Map

Tenth Grade

DRAFT — December 1, 2004

Academic Content Standards	**EP&C**	**The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:**
1. Students relate the moral and ethical principles in ancient Greek and Roman philosophy, in Judaism, and in Christianity to the development of Western political thought.		
1. Analyze the similarities and differences in Judeo-Christian and Greco-Roman views of law, reason and faith, and duties of the individual.	V b	• The process of making decisions about resources and natural systems, and the assessment of social, economic, political, and environmental factors have changed over time, based on the moral and ethical principles of Greek, Roman, Jewish and Christian philosophies.
2. Trace the development of the Western political ideas of the rule of law and illegitimacy of tyranny, using selections from Plato's *Republic* and Aristotle's *Politics.*		
3. Consider the influence of the U.S. Constitution on political systems in the contemporary world.		
2. Students compare and contrast the Glorious Revolution of England, the American Revolution, and the French Revolution and their enduring effects worldwide on the political expectations for self-government and individual liberty.		
1. Compare the major ideas of philosophers and their effects on the democratic revolutions in England, the United States, France, and Latin America (e.g., John Locke, Charles-Louis Montesquieu, Jean-Jacques Rousseau, Simón Bolívar, Thomas Jefferson, James Madison).		
2. List the principles of the Magna Carta, the English Bill of Rights (1689), the American Declaration of Independence (1776), the French Declaration of the Rights of Man and the Citizen (1789), and the U.S. Bill of Rights (1791).		
3. Understand the unique character of the American Revolution, its spread to other parts of the world, and its continuing significance to other nations.		
4. Explain how the ideology of the French Revolution led France to develop from constitutional monarchy to democratic despotism to the Napoleonic empire.		
5. Discuss how nationalism spread across Europe with Napoleon but was repressed for a generation under the Congress of Vienna and Concert of Europe until the Revolutions of 1848.		
3. Students analyze the effects of the Industrial Revolution in England, France, Germany, Japan, and the United States.		
1. Analyze why England was the first country to industrialize.	II a b	• The growth in human populations and human communities in England placed greater demands on the natural systems. • These pressures provided an economic opportunity for the English to improve the methods they used to extract, harvest, transport, and consume natural resources.

2. Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison).	I a b; II a b; III b; IV a b; V a	• Natural systems provided resources (energy-based goods and ecosystem services) necessary for industrialization. • Resource availability, scientific and technological changes, and new forms of energy brought about massive social, economic, and cultural change. • The methods used to extract, harvest, transport, and consume natural resources and the rates of consumption brought on by industrialization affected natural systems. • Humans depend upon cycles that are part of natural systems. • The byproducts of energy production for industrialization (including the use of steam and the burning of coal as energy sources) affected natural systems. These byproducts were not readily prevented from entering natural systems and may have been beneficial, neutral or detrimental in their effects. • While decisions regarding supply and consumption of natural resources were based upon a variety of factors, the usefulness of a resource in providing a reliable supply of energy to industry was often a primary factor (e.g., cost/benefit analyses).
3. Describe the growth of population, rural to urban migration, and growth of cities associated with the Industrial Revolution.	II a b c d; IV a b c	• The Industrial Revolution directly resulted in the growth in human populations, migrations from rural to urban areas, and the growth of cities. • As human communities grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems.
4. Trace the evolution of work and labor, including the demise of the slave trade and the effects of immigration, mining and manufacturing, division of labor, and the union movement.	I a; II a b; IV a b; V b	• Mining and manufacturing rely on natural systems to produce the goods (e.g., minerals) that support these practices. • The byproducts of mining and manufacturing are not readily prevented from entering natural systems. Their effects, whether beneficial, neutral, or detrimental, may influence the health of humans. • Decisions made about mining and manufacturing practices are based on a wide range of considerations, including public health. • Considerations resulted in the establishment of institutions (e.g. unions) to protect the health of laborers.
5. Understand the connections among natural resources, entrepreneurship, labor, and capital in an industrial economy.	I a b; II b; V a	• Inextricable connections exist among natural systems and resources, entrepreneurship, labor, and capital in an industrial economy. • Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Human labor became a resource needed to extract, harvest, transport, and consume natural resources to support the industrial economy. Each of these activities had an effect upon the natural systems. • Decisions made regarding natural resource use in industrialization are based primarily on acquiring raw materials and guaranteeing a reliable supply of energy to support industrial activity. When resources are in plentiful supply, economics and support of industrial growth may be the primary forces governing decisions and actions.
6. Analyze the emergence of capitalism as a dominant economic pattern and the responses to it, including Utopianism, Social Democracy, Socialism, and Communism.		
7. Describe the emergence of Romanticism in art and literature (e.g., the poetry of William Blake and William Wordsworth), social criticism (e.g., the novels of Charles Dickens), and the move away from Classicism in Europe.		

4. Students analyze patterns of global change in the era of New Imperialism in at least two of the following regions or countries: Africa, Southeast Asia, China, India, Latin America, and the Philippines.		
1. Describe the rise of industrial economies and their link to imperialism and colonialism (e.g., the role played by national security and strategic advantage; moral issues raised by the search for national hegemony, Social Darwinism, and the missionary impulse; material issues such as land, resources, and technology).	I a b; II a b c d; III b c; V a b	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. Industrialization was made possible by the raw materials of natural systems, most of which were supplied by the colonial possessions in Africa, Southeast Asia, China, India, Latin America, and the Philippines. • As human communities grew, resource extraction and supply methods and consumption rates changed. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend on cycles that are part of natural systems. • Humans can alter the cycles as they meet their needs. • Decisions made during the rise of industrial economies were based primarily on acquiring raw materials and guaranteeing a reliable supply of energy to support industrial activity. • These decisions resulted in the establishment of colonial possessions that supplied the natural resources and energy supplies to support industrial economies.
2. Discuss the locations of the colonial rule of such nations as England, France, Germany, Italy, Japan, the Netherlands, Russia, Spain, Portugal, and the United States.	I a b; V a	• Natural systems provide resources (goods and ecosystem services) on which humans rely. • Decisions to colonize certain areas of the world were made based primarily on acquiring raw materials (resources) and guaranteeing a reliable supply of energy for the home country.
3. Explain imperialism from the perspective of the colonizers and the colonized and the varied immediate and long-term responses by the people under colonial rule.	I a	• People under colonial rule rebelled in large part because they did not have control over their natural resources.
4. Describe the independence struggles of the colonized regions of the world, including the roles of leaders, such as Sun Yat-sen in China, and the roles of ideology and religion.		

5. Students analyze the causes and course of the First World War.		
1. Analyze the arguments for entering into war presented by leaders from all sides of the Great War and the role of political and economic rivalries, ethnic and ideological conflicts, domestic discontent and disorder, and propaganda and nationalism in mobilizing the civilian population in support of "total war."	I a b, V a	• Political alliances, assassinations, and warfare are outcomes of decisions to acquire or ensure access to goods and ecosystem services provided by natural systems. • These goods and ecosystem services are essential to human communities and social systems.
2. Examine the principal theaters of battle, major turning points, and the importance of geographic factors in military decisions and outcomes (e.g., topography, waterways, distance, climate).	I a b	• Natural systems and physical geography provide resources (goods and ecosystem services) that humans rely on to meet their military needs.
3. Explain how the Russian Revolution and the entry of the United States affected the course and outcome of the war.		
4. Understand the nature of the war and its human costs (military and civilian) on all sides of the conflict, including how colonial peoples contributed to the war effort.		
5. Discuss human rights violations and genocide, including the Ottoman government's actions against Armenian citizens.		

6. Students analyze the effects of the First World War.		
1. Analyze the aims and negotiating roles of world leaders, the terms and influence of the Treaty of Versailles and Woodrow Wilson's Fourteen Points, and the causes and effects of the United States's rejection of the League of Nations on world politics.		
2. Describe the effects of the war and resulting peace treaties on population movement, the international economy, and shifts in the geographic and political borders of Europe and the Middle East.	II d; V a	• Many treaties were based on the demand for additional natural resources. • Economic factors related to control over natural resources were considered in decisions about the war and development of peace treaties.
3. Understand the widespread disillusionment with prewar institutions, authorities, and values that resulted in a void that was later filled by totalitarians.		
4. Discuss the influence of World War I on literature, art, and intellectual life in the West (e.g., Pablo Picasso, the "lost generation" of Gertrude Stein, Ernest Hemingway)		

7. Students analyze the rise of totalitarian governments after World War I.		
1. Understand the causes and consequences of the Russian Revolution, including Lenin's use of totalitarian means to seize and maintain control (e.g., the Gulag).		
2. Trace Stalin's rise to power in the Soviet Union and the connection between economic policies, political policies, the absence of a free press, and systematic violations of human rights (e.g., the Terror Famine in Ukraine).	II d; V a	• In Stalin's five-year plan, the use of land was changed to accommodate the Communist plan for industrialization. • Economic and legal factors related to control over natural resources were considered in these decisions.
3. Analyze the rise, aggression, and human costs of totalitarian regimes (Fascist and Communist) in Germany, Italy, and the Soviet Union, noting especially their common and dissimilar traits.		

8. Students analyze the causes and consequences of World War II.		
1. Compare the German, Italian, and Japanese drives for empire in the 1930s, including the 1937 Rape of Nanking, other atrocities in China, and the Stalin-Hitler Pact of 1939.	II d; V a	• The growing populations of Germany, Italy and Japan resulted in an increasing demand for natural resources to support these populations. • Economic factors related to control over natural resources were considered in decisions about the war and development of peace treaties.
2. Understand the role of appeasement, nonintervention (isolationism), and the domestic distractions in Europe and the United States prior to the outbreak of World War II.		
3. Identify and locate the Allied and Axis powers on a map and discuss the major turning points of the war, the principal theaters of conflict, key strategic decisions, and the resulting war conferences and political resolutions, with emphasis on the importance of geographic factors.	I a b	• Natural systems and physical geography provide resources (goods and ecosystem services) that humans rely on to meet their political or military needs.
4. Describe the political, diplomatic, and military leaders during the war (e.g., Winston Churchill, Franklin Delano Roosevelt, Emperor Hirohito, Adolf Hitler, Benito Mussolini, Joseph Stalin, Douglas MacArthur, Dwight Eisenhower).		

5. Analyze the Nazi policy of pursuing racial purity, especially against the European Jews; its transformation into the Final Solution; and the Holocaust that resulted in the murder of six million Jewish civilians.		
6. Discuss the human costs of the war, with particular attention to the civilian and military losses in Russia, Germany, Britain, the United States, China, and Japan.		

9. Students analyze the international developments in the post-World World War II world.		
1. Compare the economic and military power shifts caused by the war, including the Yalta Pact, the development of nuclear weapons, Soviet control over Eastern European nations, and the economic recoveries of Germany and Japan.		
2. Analyze the causes of the Cold War, with the free world on one side and Soviet client states on the other, including competition for influence in such places as Egypt, the Congo, Vietnam, and Chile.	I a b; II a b c d; V a b	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Both industrialized and non-industrialized nations are sustained by reliable quantities and qualities of raw materials from natural systems. • Changing relationships between industrialized and non-industrialized nations caused changes in resource supply methods and consumption rates, the operation of communities, and laws, regulations, policies, and incentives governing resource use and management. Such changes have affected natural systems. • While decisions regarding natural resources and natural systems in both industrialized and non-industrialized nations were based on a variety of factors, a primary motivation during the Cold War was the importance of acquiring raw materials, guaranteeing a reliable supply of energy, and establishing consumer markets for the finished products that would enable industry to grow.
3. Understand the importance of the Truman Doctrine and the Marshall Plan, which established the pattern for America's postwar policy of supplying economic and military aid to prevent the spread of Communism and the resulting economic and political competition in arenas such as Southeast Asia (i.e., the Korean War, Vietnam War), Cuba, and Africa.	I a b; II a b c d; V a	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. Industrialized and non-industrialized nations are sustained by reliable quantities and qualities of raw materials from natural systems. Changing relationships between industrialized and non-industrialized nations caused changes in the resource supply methods and consumption rates, the operation of communities, and laws, regulations, policies, and incentives governing resource use and management. Such changes have affected natural systems. • Decisions made regarding natural resources and natural systems in non-industrialized nations were based on acquiring raw materials, guaranteeing a reliable supply of energy, and establishing consumer markets for the finished products that would enable industry to grow.
4. Analyze the Chinese Civil War, the rise of Mao Tse-tung, and the subsequent political and economic upheavals in China (e.g., the Great Leap Forward, the Cultural Revolution, and the Tiananmen Square uprising).	II a d	• Mao's Great Leap Forward programs and policies changed the Chinese landscape in dramatic ways.
5. Describe the uprisings in Poland (1952), Hungary (1956), and Czechoslovakia (1968) and those countries' resurgence in the 1970s and 1980s as people in Soviet satellites sought freedom from Soviet control.		
6. Understand how the forces of nationalism developed in the Middle East, how the Holocaust affected world opinion regarding the need for a Jewish state, and the significance and effects of the location and establishment of Israel on world affairs.		

7. Analyze the reasons for the collapse of the Soviet Union, including the weakness of the command economy, burdens of military commitments, and growing resistance to Soviet rule by dissidents in satellite states and the non-Russian Soviet republics.		
8. Discuss the establishment and work of the United Nations and the purposes and functions of the Warsaw Pact, SEATO, NATO, and the Organization of American States.	V a b	• International considerations, brought on by the establishment of international institutions (e.g., United Nations) and treaties are included in the spectrum of factors in decision-making.

10. Students analyze instances of nation-building in the contemporary world in at least two of the following regions or countries: the Middle East, Africa, Mexico and other parts of Latin America, and China.		
1. Understand the challenges in the regions, including their geopolitical, cultural, military, and economic significance and the international relationships in which they are involved.	I a b; II a b c d; V a	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. • Industrialized and non-industrialized nations are sustained by reliable quantities and qualities of raw materials from natural systems. • Changing relationships between industrialized and non-industrialized nations caused changes in the resource supply methods and consumption rates, the operation of communities, and laws, regulations, policies, and incentives governing resource use and management. Such changes have affected natural systems. • Decisions regarding natural resources and natural systems in the non-industrialized nations are often based on acquiring raw materials, guaranteeing a reliable supply of energy, and establishing consumer markets for the finished products that enable industry to grow.
2. Describe the recent history of the regions, including political divisions and systems, key leaders, religious issues, natural features, resources, and population patterns.	I a b; II a b c d; III b c; IV a b; V a b	• Natural systems provide resources (goods and ecosystem services) upon which humans rely. The resources available in these nations help determine their cultures, economies, and lifestyles. • As human communities grow, resource extraction and supply methods and consumption rates change. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management have lasting and visible effects on the natural features within their political borders. • Humans depend on cycles that are part of natural systems. • Humans can alter the cycles as they meet their needs. • The quantity of resources consumed and the quantity and characteristics of the byproducts of resource production have increased as these nations have developed. Such human activity can have an effect on natural systems within their political borders. • Byproducts are not readily prevented from entering natural systems and they may have beneficial, neutral, or detrimental effects. • Decisions regarding natural resources and natural systems that are made by these nations are influenced by a spectrum of considerations that can differ from country to country. • The process of making decisions about resources and the assessment of social, economic, political, and environmental factors within these countries may have changed over time.
3. Discuss the important trends in the regions today and whether they appear to serve the cause of individual freedom and democracy.	V a b	• The spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions varies across these regions. • The process of making decisions about resources and the assessment of social, economic, political, and environmental factors varies across these regions.

11. Students analyze the integration of countries into the world economy and the information, technological, and communications revolutions (e.g., television, satellites, computers).		
	I a b; II a b c d; IV a b; V b c	• Natural systems provide resources (goods and ecosystem services) on which humans have come to rely for information, technological, and communication advancements. • The growth of populations and communities in countries that supply resources key to information, technological and communication advancement cause changes in resource supply methods and consumption rates, the operation of their communities, and the laws, regulations, policies, and incentives they have to govern the use and management of their natural resources. These changes have all had lasting and visible effects on natural systems. • The quantity of resources consumed, and the quantity of and character of the byproducts of resource production were influenced as each nation joined the global economy. • Byproducts released as a result of global trade in information, technology, and communications may enter natural systems and have beneficial, neutral, or detrimental effects. • Decisions made regarding natural resources in the global economy are based on many factors.

History/Social Science

Standards Alignment Map

Eleventh Grade

DRAFT — December 1, 2004

Eleventh Grade — California History/Social Science Standards

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
1. Students analyze the significant events in the founding of the nation and its attempts to realize the philosophy of government described in the Declaration of Independence.		
1. Describe the Enlightenment and the rise of democratic ideas as the context in which the nation was founded.		
2. Analyze the ideological origins of the American Revolution, the Founding Fathers' philosophy of divinely bestowed unalienable natural rights, the debates on the drafting and ratification of the Constitution, and the addition of the Bill of Rights.		
3. Understand the history of the Constitution after 1787 with emphasis on federal versus state authority and growing democratization.		
4. Examine the effects of the Civil War and Reconstruction and of the industrial revolution, including demographic shifts and the emergence in the late nineteenth century of the United States as a world power.		

2. Students analyze the relationship among the rise of industrialization, large-scale rural-to-urban migration, and massive immigration from Southern and Eastern Europe.		
1. Know the effects of industrialization on living and working conditions, including the portrayal of working conditions and food safety in Upton Sinclair's *The Jungle.*	II a b c d; V b	• The growth of populations in industrialized communities (through rural to urban migration and immigration); the size of the communities in industrialized areas; their resource supply methods and consumption rates; the operation of those communities; and the laws, regulations, policies and incentives developed to govern the resource use and management by and within them affected the natural systems. • The assessment of social, economic, political, and environmental factors has changed over time, leading to changes in human practices that use natural resources.
2. Describe the changing landscape, including the growth of cities linked by industry and trade, and the development of cities divided according to race, ethnicity, and class.	I a b; II a b c d	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely, economically and otherwise through industry and trade. • As populations in industrialized communities grew, changes occurred in the size, composition, and operation of these communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems.
3. Trace the effect of the Americanization movement.		
4. Analyze the effect of urban political machines and responses to them by immigrants and middle-class reformers.		
5. Discuss corporate mergers that produced trusts and cartels and the economic and political policies of industrial leaders.		

6. Trace the economic development of the United States and its emergence as a major industrial power, including its gains from trade and the advantages of its physical geography.	I a b; II a b c d; V a	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely. Economic development was made possible in the United States by the availability of certain goods and services. The security of its borders is also supported by natural resources (physical geography). • As the United States emerged as a major industrial power and its population grew, changes occurred in the size, composition, and operation of these communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • These changes affected the natural systems in the United States. • Economic considerations influenced decisions about natural resources and systems in the United States.
7. Analyze the similarities and differences between the ideologies of Social Darwinism and Social Gospel (e.g., using biographies of William Graham Sumner, Billy Sunday, Dwight L. Moody).		
8. Examine the effect of political programs and activities of Populists.		
9. Understand the effect of political programs and activities of the Progressives (e.g., federal regulation of railroad transport, Children's Bureau, the Sixteenth Amendment, Theodore Roosevelt, Hiram Johnson).	II d; IV a; V a b	• The laws, regulations, policies, and incentives (political programs) developed by human communities to govern the use and management of their natural resources have an effect on natural systems. • The quantity of resources consumed and the quantity and characteristics of the byproducts resulting from economic activity in the Unites States had lasting and cumulative effects on its natural systems. • The Progressive doctrine influenced decisions made regarding natural resources and systems (e.g., the founding of national parks, etc.). Human behavior and practice have been adjusted over time in order to conserve the natural systems that sustain the social systems in human communities.

3. Students analyze the role religion played in the founding of America, its lasting moral, social, and political impacts, and issues regarding religious liberty.		
1. Describe the contributions of various religious groups to American civic principles and social reform movements (e.g., civil and human rights, individual responsibility and the work ethic, antimonarchy and self-rule, worker protection, family-centered communities).	V a	• Socio-cultural factors, including religious beliefs and practices, influence decisions regarding resources and natural systems.
2. Analyze the great religious revivals and the leaders involved in them, including the First Great Awakening, the Second Great Awakening, the Civil War revivals, the Social Gospel Movement, the rise of Christian liberal theology in the nineteenth century, the impact of the Second Vatican Council, and the rise of Christian fundamentalism in current times.		
3. Cite incidences of religious intolerance in the United States (e.g., persecution of Mormons, anti-Catholic sentiment, anti-Semitism).		
4. Discuss the expanding religious pluralism in the United States and California that resulted from large-scale immigration in the twentieth century.		
5. Describe the principles of religious liberty found in the Establishment and Free Exercise clauses of the First Amendment, including the debate on the issue of separation of church and state.		

4. Students trace the rise of the United States to its role as a world power in the twentieth century.		
1. List the purpose and the effects of the Open Door policy.	I a b; II a b c d; V a	• Natural systems provide resources (goods and ecosystem services) on which humans rely. Industrialized nations and non-industrialized nations are sustained by raw materials from natural systems. • Relationships between industrialized and non-industrialized nations caused changes to the methods used to extract, harvest, transport, and consume natural resources; the rates of consumption of natural resources; the operation of communities; and the laws, regulations, policies, and incentives governing resource use and management of non-industrialized nations. • These changes had effects on natural systems. • While decisions regarding natural resources are based on a variety of factors, during this period, many were based on the need to acquire raw materials to guarantee a reliable supply of energy and establishing consumer markets for the finished products that would enable industry to grow.
2. Describe the Spanish-American War and U.S. expansion in the South Pacific.	I a b; II a b c d; V a	• Natural systems provide resources (goods and ecosystem services) on which humans rely. Industrialized nations and non-industrialized nations are sustained by raw materials from natural systems. • Relationships between industrialized and non-industrialized nations (Spain and its colonies, and nations in the South Pacific, and the war between the US and Spain) caused changes to the methods used to extract, harvest, transport, and consume natural resources; the rates of consumption of natural resources; the operation of communities; and the laws, regulations, policies, and incentives governing resource use and management of non-industrialized nations. • These changes had effects on natural systems. • Decisions made regarding natural resources are based on acquiring raw materials to guarantee a reliable supply of energy, and establishing consumer markets for the finished products that would enable industry to grow.
3. Discuss America's role in the Panama Revolution and the building of the Panama Canal.	I a b; II b c d; III b c; V a	• Natural systems provide resources (goods and ecosystem services) on which humans rely. • The relationships between the industrialized United States and non-industrialized Panama were influenced by the need to change resource supply methods and consumption rates in Panama, as well as the resultant changes to the operation of their communities and their laws, regulations, policies, and incentives that governed resource use and management. • These changes had effects on their natural systems. • Humans depend on the cycles that are part of natural systems. • Humans can alter those cycles as they meet their needs. • Decisions made regarding natural systems are based upon many factors. The decision to assist Panama in their revolution was made to assure their cooperation in building the Panama Canal, which was based on the need to acquire raw materials and guarantee a reliable supply of goods to consumer markets that thus enabled the power of industrialized nations to grow.
4. Explain Theodore Roosevelt's Big Stick diplomacy, William Taft's Dollar Diplomacy, and Woodrow Wilson's Moral Diplomacy, drawing on relevant speeches.		
5. Analyze the political, economic, and social ramifications of World War I on the home front.		
6. Trace the declining role of Great Britain and the expanding role of the United States in world affairs after World War II.		

5. Students analyze the major political, social, economic, technological, and cultural developments of the 1920s.		
1. Discuss the policies of Presidents Warren Harding, Calvin Coolidge, and Herbert Hoover.		
2. Analyze the international and domestic events, interests, and philosophies that prompted attacks on civil liberties, including the Palmer Raids, Marcus Garvey's "back-to-Africa" movement, the Ku Klux Klan, and immigration quotas and the responses of organizations such as the American Civil Liberties Union, the National Association for the Advancement of Colored People, and the Anti-Defamation League to those attacks.		
3. Examine the passage of the Eighteenth Amendment to the Constitution and the Volstead Act (Prohibition).		
4. Analyze the passage of the Nineteenth Amendment and the changing role of women in society.		
5. Describe the Harlem Renaissance and new trends in literature, music, and art, with special attention to the work of writers (e.g., Zora Neale Hurston, Langston Hughes).		
6. Trace the growth and effects of radio and movies and their role in the worldwide diffusion of popular culture.		
7. Discuss the rise of mass production techniques, the growth of cities, the impact of new technologies (e.g., the automobile, electricity), and the resulting prosperity and effect on the American landscape.	I a b c; II a b c d; III c; IV a b; V a	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely, economically and otherwise through the development of mass production techniques and new technologies. • As populations in industrialized communities grew, changes occurred in the size, composition, and operation of these communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • New technologies, including the automobile and electricity, continue to affect natural systems through the construction of infrastructure to support those technologies. • The quantity of resources consumed and products produced through mass production, and the quantity and characteristics of the byproducts of mass production techniques and new technologies had a lasting and cumulative effect on natural systems. • Byproducts of mass production techniques and new technologies were not readily prevented from entering natural systems and having beneficial, neutral or detrimental effects. • Decisions made regarding use of natural resources to support mass production techniques and development of new technologies are based on a variety of factors.

6. Students analyze the different explanations for the Great Depression and how the New Deal fundamentally changed the role of the federal government.		
1. Describe the monetary issues of the late nineteenth and early twentieth centuries that gave rise to the establishment of the Federal Reserve and the weaknesses in key sectors of the economy in the late 1920s.		

2. Understand the explanations of the principal causes of the Great Depression and the steps taken by the Federal Reserve, Congress, and Presidents Herbert Hoover and Franklin Delano Roosevelt to combat the economic crisis	I a b c; II a b; III b c; IV a b; V a b	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely. • If those systems are not healthy, they fail to produce the expected quantity and quality of resources. • The growth of populations in areas of the United States, and their resource supply methods (e.g., agricultural practices) and consumption rates affected the natural systems from which resources came. • Humans depend upon the cycles and effects of cycles (droughts may be a part of a natural cycle) that are part of natural systems. • Humans can alter these cycles as they meet their needs. • The quantity of resources consumed, and the quantity and character of the byproducts of agricultural practices had a lasting and cumulative effect on natural systems (e.g., erosion and soil exhaustion) and ultimately resulted in natural system failures. • Decisions made regarding natural resources were based on a variety of factors. • Human behavior and practices during the Depression and Dust Bowl era were adjusted in order to preserve the natural systems that sustained human communities.
3. Discuss the human toll of the Depression, natural disasters, and unwise agricultural practices and their effects on the depopulation of rural regions and on political movements of the left and right, with particular attention to the Dust Bowl refugees and their social and economic impacts in California.	I a b c; II a b; III b c; IV a b; V a b	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely. • If those systems are not healthy, they fail to produce the expected quantity and quality of resources. • The growth of populations in areas of the United States, and their resource supply methods (e.g., agricultural practices) and consumption rates affected the natural systems from which resources came. • Humans depend upon the cycles and effects of cycles (droughts may be a part of a natural cycle) that are part of natural systems. • Humans can alter these cycles as they meet their needs. • The quantity of resources consumed, and the quantity and character of the byproducts of agricultural practices had a lasting and cumulative effect on natural systems (e.g., erosion and soil exhaustion) and ultimately resulted in natural system failures. • Decisions made regarding natural resources were based on a variety of factors. • Human behavior and practices during the Depression and Dust Bowl era were adjusted in order to preserve the natural systems that sustained human communities.

4. Analyze the effects of and the controversies arising from New Deal economic policies and the expanded role of the federal government in society and the economy since the 1930s (e.g., Works Progress Administration, Social Security, National Labor Relations Board, farm programs, regional development policies, and energy development projects such as the Tennessee Valley Authority, California Central Valley Project, and Bonneville Dam).	II a b c d; III b c; IV a b; V a b	• During the 1930's and beyond, the federal government was responsible for many changes to populations, the locations of communities, resource supply methods and consumption rates, the expansion and operation of communities, and the laws, regulations, policies and incentives developed to govern the resource use and management in the nation. • Federal efforts to restore the economy of the United States affected the natural systems in the nation. • Humans depend upon the cycles that are part of natural systems. • Humans can alter these cycles as they meet their needs. • The quantity of resources consumed, and the quantity and character of the byproducts of federal projects had a lasting and cumulative effect on natural systems. • These byproducts were not readily prevented from entering natural systems and had beneficial, neutral or detrimental effects. • Human activity alters the flow of matter and energy in natural systems—on purpose or unknowingly—in order to meet human needs (industrial or agricultural). Many of the public works projects that were part of the New Deal did this in obvious ways (e.g., dam construction). • The quantity of energy consumed, the quantity of useful goods produced, and the quantity and toxicity of the byproducts of industry and agriculture had increased with increased industrialization. These had a lasting and cumulative effect on natural systems, in some cases resulting in natural system failures and a complete change in human social systems (some of which were brought on by New Deal incentives). • Decisions regarding natural resources were based on stimulating the American economy. • Economic, social, and environmental assessments changed and human behavior and practice were adjusted in order to preserve the natural systems that sustained the social systems.
5. Trace the advances and retreats of organized labor, from the creation of the American Federation of Labor and the Congress of Industrial Organizations to current issues of a postindustrial, multinational economy, including the United Farm Workers in California.	II b d; IV b	• Agricultural practices influenced the health of individual human lives and of human communities and the environment. • These practices fomented the establishment of labor unions.

7. Students analyze America's participation in World War II.		
1. Examine the origins of American involvement in the war, with an emphasis on the events that precipitated the attack on Pearl Harbor.	I a b	• Japan's growing populations placed increasing demands for natural resources. • Japan sought control over natural resources in the Pacific and Asian regions and desired to expand its territory as a result.
2. Explain U.S. and Allied wartime strategy, including the major battles of Midway, Normandy, Iwo Jima, Okinawa, and the Battle of the Bulge.	I a b; II d, V a	• The engagement of United States submarine warfare against Japan cut off Japan's supply of natural resources from Asia.
3. Identify the roles and sacrifices of individual American soldiers, as well as the unique contributions of the special fighting forces (e.g., the Tuskegee Airmen, the 442nd Regimental Combat team, the Navajo Code Talkers).		
4. Analyze Roosevelt's foreign policy during World War II (e.g., Four Freedoms speech).		

5. Discuss the constitutional issues and impact of events on the U.S. home front, including the internment of Japanese Americans (e.g., *Fred Korematsu v. United States of America)* and the restrictions on German and Italian resident aliens; the response of the administration to Hitler's atrocities against Jews and other groups; the roles of women in military production; and the roles and growing political demands of African Americans.		
6. Describe major developments in aviation, weaponry, communication, and medicine and the war's impact on the location of American industry and use of resources.	I a b; II a b c d; III b; IV a b; V a b	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely to meet political and military needs. • The location of American military and industry build-up at this time caused the populations in certain areas and communities to grow, changing their resource supply methods, consumption rates, and the operation of their communities. • The laws, regulations, policies and incentives developed during wartime to govern the resource use and management by and within these communities affected the surrounding natural systems. • Humans depend upon the cycles that are part of natural systems. • The quantity of resources consumed, and the quantity and character of the byproducts of the war effort and supporting industry had a lasting and cumulative effect on natural systems. • These byproducts were not readily prevented from entering natural systems and had beneficial, neutral or detrimental effects. • Scarcity of certain natural resources such as metal and rubber that were required for military operations required changes in decision-making and human behavior. • Decisions regarding natural resources during World War II were based on a variety of factors. • Political, social, and environmental assessments changed, and human behavior and practice was adjusted in order to preserve the natural systems that sustained the war effort during this time.
7. Discuss the decision to drop atomic bombs and the consequences of the decision (Hiroshima and Nagasaki).	I a b; IV a b; V a b	• Natural systems provide resources (goods and ecosystem services) on which human communities have come to rely to meet their political and military needs. • The quantity and characteristics of the byproducts of atomic weaponry affected the natural systems in Nagasaki and Hiroshima and, near the facilities in the U.S. where the fissile materials were produced. These byproducts were not readily prevented from entering natural systems and had detrimental effects. • Decisions regarding natural systems are based on many factors. • Human behavior and practices are sometimes adjusted in order to preserve natural systems. • The consequences of the decision to drop atomic bombs resulted in changes in the assessment of social, economic, political, and environmental factors.
8. Analyze the effect of massive aid given to Western Europe under the Marshall Plan to rebuild itself after the war and the importance of a rebuilt Europe to the U.S. economy.		

8. Students analyze the economic boom and social transformation of post-World War II America.		
1. Trace the growth of service sector, white collar, and professional sector jobs in business and government.		
2. Describe the significance of Mexican immigration and its relationship to the agricultural economy, especially in California.		
3. Examine Truman's labor policy and congressional reaction to it.		

4. Analyze new federal government spending on defense, welfare, interest on the national debt, and federal and state spending on education, including the California Master Plan.		
5. Describe the increased powers of the presidency in response to the Great Depression, World War II, and the Cold War.		
6. Discuss the diverse environmental regions of North America, their relationship to local economies, and the origins and prospects of environmental problems in those regions.	I a b c; II a b c d; III b c; IV a b; V a b	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely. Regions of North America provide unique resources that determine the culture, economies, and lifestyle of the human communities in those regions. • If the natural systems in those regions are not healthy, they fail to produce the expected quantity and quality of resources. • As populations in regions in North America grew, changes occurred in the size, composition, and operation of human communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Humans depend upon the cycles that are part of natural systems. • Humans can alter these cycles as they meet their needs. • The quantity of resources consumed, and the quantity and character of the byproducts of regional human activities has a lasting and cumulative effect on natural systems. • These byproducts are not readily prevented from entering natural systems and have beneficial, neutral or detrimental effects. • Decisions regarding regional natural systems are based on many factors and may vary across regions. • Social, economic, political and environmental assessments over time have caused human behavior and practice to adjust in order to preserve the natural systems that sustain the regional social systems.
7. Describe the effects on society and the economy of technological developments since 1945, including the computer revolution, changes in communication, advances in medicine, and improvements in agricultural technology.	II a b c; IV a; V a	• Technological advances since 1945 have changed the types and quantities of resources consumed, the quantity and qualities of useful products, and the quantity and character of the byproducts generated by human practices. These changes have had a lasting and cumulative effect on natural systems. • Technological advances since 1945 have changed human practices related to industrial, housing, and land development that in turn can alter or affect the viability of natural systems. • Decisions concerning natural resources are influenced by technological advancements.
8. Discuss forms of popular culture, with emphasis on their origins and geographic diffusion (e.g., jazz and other forms of popular music, professional sports, architectural and artistic styles).		

9. Students analyze U.S. foreign policy since World War II.		
1. Discuss the establishment of the United Nations and International Declaration of Human Rights, International Monetary Fund, World Bank, and General Agreement on Tariffs and Trade (GATT) and their importance in shaping modern Europe and maintaining peace and international order.		
2. Understand the role of military alliances, including NATO and SEATO, in deterring communist aggression and maintaining security during the Cold War.		

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3. Trace the origins and geopolitical consequences (foreign and domestic) of the Cold War and containment policy, including the following: a) The era of McCarthyism, instances of domestic Communism (e.g., Alger Hiss) and blacklisting b) The Truman Doctrine c) The Berlin Blockade d) The Korean War e) The Bay of Pigs invasion and the Cuban Missile Crisis f) Atomic testing in the American West, the "mutual assured destruction" doctrine, and disarmament policies g) The Vietnam War h) Latin American policy		
4. List the effects of foreign policy on domestic policies and vice versa (e.g., protests during the war in Vietnam, the "nuclear freeze" movement).		
5. Analyze the role of the Reagan administration and other factors in the victory of the West in the Cold War.		
6. Describe U.S. Middle East policy and its strategic, political, and economic interests, including those related to the Gulf War.	I a b; II b c d; V a	• Natural systems provide resources (goods and ecosystem services) on which humans rely. • Decisions made regarding natural resources are based on acquiring raw materials, guaranteeing a reliable supply of energy, and establishing consumer markets for the finished products that enable industry to grow. • Transportation and industrial practices have been influenced by the U.S. Middle East policy and political and military events in the Persian Gulf.
7. Examine relations between the United States and Mexico in the twentieth century, including key economic, political, immigration, and environmental issues.	II a b c d; III b; IV a b; V a b	• As populations in the United States and Mexico grow, changes occur in the size, composition, and operation of human communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management have effects on the surrounding natural systems. • Humans depend on cycles that are part of natural systems. • The quantity of resources consumed, and the quantity and character of the byproducts of regional human activities have a cumulative effect on natural systems. • These byproducts are not readily prevented from entering natural systems and have beneficial, neutral or detrimental effects. • Environmental impacts are not contained by political boundaries and differing environmental practices in the United States and Mexico affect natural systems in both countries. The United States and Mexico are beginning to realize there are no permanent or impermeable boundaries between systems—impacts to one system result in impacts to other systems. • How decisions are made regarding natural resources and the factors that influence those decisions vary in the United States and Mexico. • Human behavior and practice are in the process of adjusting in order to preserve the natural systems that sustain the social systems of the United States and Mexico.

10. Students analyze the development of federal civil rights and voting rights.		
1. Explain how demands of African Americans helped produce a stimulus for civil rights, including President Roosevelt's ban on racial discrimination in defense industries in 1941, and how African Americans' service in World War II produced a stimulus for President Truman's decision to end segregation in the armed forces in 1948.		
2. Examine and analyze the key events, policies, and court cases in the evolution of civil rights, including *Dred Scott* v. *Sandford, Plessy* v. *Ferguson, Brown* v. *Board of Education, Regents of the University of California* v. *Bakke,* and California Proposition 209.		
3. Describe the collaboration on legal strategy between African American and white civil rights lawyers to end racial segregation in higher education.		
4. Examine the roles of civil rights advocates (e.g., A. Philip Randolph, Martin Luther King, Jr., Malcolm X, Thurgood Marshall, James Farmer, Rosa Parks), including the significance of Martin Luther King, Jr.'s "Letter from Birmingham Jail" and "I Have a Dream" speech.		
5. Discuss the diffusion of the civil rights movement of African Americans from the churches of the rural South and the urban North, including the resistance to racial desegregation in Little Rock and Birmingham, and how the advances influenced the agendas, strategies, and effectiveness of the quests of American Indians, Asian Americans, and Hispanic Americans for civil rights and equal opportunities.		
6. Analyze the passage and effects of civil rights and voting rights legislation (e.g., 1964 Civil Rights Act, Voting Rights Act of 1965) and the Twenty-Fourth Amendment, with an emphasis on equality of access to education and to the political process.		
7. Analyze the women's rights movement from the era of Elizabeth Stanton and Susan Anthony and the passage of the Nineteenth Amendment to the movement launched in the 1960s, including differing perspectives on the roles of women.		

11. Students analyze the major social problems and domestic policy issues in contemporary American society.		
1. Discuss the reasons for the nation's changing immigration policy, with emphasis on how the Immigration Act of 1965 and successor acts have transformed American society.		

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2. Discuss the significant domestic policy speeches of Truman, Eisenhower, Kennedy, Johnson, Nixon, Carter, Reagan, Bush, and Clinton (e.g., with regard to education, civil rights, economic policy, environmental policy).	II d; V a b	• The laws, regulations, policies and incentives that govern (or that leaders hope will govern) the use and management of natural systems and resources influence the health of natural systems. • Decisions regarding natural resources and systems are based on many factors—and influence policy. • Domestic policy speeches reflect necessary changes in social, economic and environmental assessments of human practices with regard to natural and human social systems that affect the environment. • Policy speeches over time reflect changes to the assessment of social, economic, political, and environmental factors.
3. Describe the changing roles of women in society as reflected in the entry of more women into the labor force and the changing family structure.		
4. Explain the constitutional crisis originating from the Watergate scandal.		
5. Trace the impact of, need for, and controversies associated with environmental conservation, expansion of the national park system, and the development of environmental protection laws, with particular attention to the interaction between environmental protection advocates and property rights advocates.	I a b c; II a b c d; III b c; IV a b; V a b	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely. • If those systems are not healthy, they fail to produce the expected quantity and quality of resources. • As populations in the United States grow, changes occurred in the size, composition, and operation of human communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems • Humans depend upon the cycles that are part of natural systems. • Humans can alter these cycles as they meet their needs. • The quantity of resources consumed, and the quantity and character of the byproducts of regional human activities have a cumulative effect on natural systems. • These byproducts are not readily prevented from entering natural systems and have beneficial, neutral or detrimental effects. • Decisions made regarding natural resources and natural systems are made through various processes, and are influenced by many factors—including property rights and individual liberties. Social, economic, political, and environmental assessments over time have caused human behavior to adjust in order to preserve natural systems.
6. Analyze the persistence of poverty and how different analyses of this issue influence welfare reform, health insurance reform, and other social policies.		
7. Explain how the federal, state, and local governments have responded to demographic and social changes such as population shifts to the suburbs, racial concentrations in the cities, Frostbelt-to-Sunbelt migration, international migration, decline of family farms, increases in out-of-wedlock births, and drug abuse.	II d; IV a; V a b	• Laws, regulations, policies and incentives are developed by the federal, state, and local governments to govern resource use and management. • These laws, regulations, policies and incentives affect the surrounding natural systems. • The quantity of resources consumed, and the quantity and character of the byproducts of regional human activities have a cumulative effect on natural systems. • Decisions made regarding natural resources and systems are based on a variety of factors. • The assessment of social, economic and environmental factors has changed over time.

History/Social Science

Standards Alignment Map

Twelfth Grade

DRAFT — December 1, 2004

Academic Content Standards	EP&C	The EP&C help students master and deepen their understanding of California's History/Social Science Standards in the following context:
Principles of American Democracy 1. Students explain the fundamental principles and moral values of American democracy as expressed in the U.S. Constitution and other essential documents of American democracy.		
1. Analyze the influence of ancient Greek, Roman, English, and leading European political thinkers such as John Locke, Charles-Louis Montesquieu, Niccolò Machiavelli, and William Blackstone on the development of American government.		
2. Discuss the character of American democracy and its promise and perils as articulated by Alexis de Tocqueville.		
3. Explain how the U.S. Constitution reflects a balance between the classical republican concern with promotion of the public good and the classical liberal concern with protecting individual rights; and discuss how the basic premises of liberal constitutionalism and democracy are joined in the Declaration of Independence as "self-evident truths."	V a	• Decisions made regarding natural resources and systems, such as land use and land ownership, are based on a variety of factors, including ensuring both personal liberties and the “common good.”
4. Explain how the Founding Fathers' realistic view of human nature led directly to the establishment of a constitutional system that limited the power of the governors and the governed as articulated in the *Federalist Papers.*		
5. Describe the systems of separated and shared powers, the role of organized interests (Federalist *Paper Number 10),* checks and balances (Federalist *Paper Number 51),* the importance of an independent judiciary (Federalist *Paper Number 78),* enumerated powers, rule of law, federalism, and civilian control of the military.		
6. Understand that the Bill of Rights limits the powers of the federal government and state governments.		
2. Students evaluate and take and defend positions on the scope and limits of rights and obligations as democratic citizens, the relationships among them, and how they are secured.		
1. Discuss the meaning and importance of each of the rights guaranteed under the Bill of Rights and how each is secured (e.g., freedom of religion, speech, press, assembly, petition, privacy).		
2. Explain how economic rights are secured and their importance to the individual and to society (e.g., the right to acquire, use, transfer, and dispose of property; right to choose one's work; right to join or not join labor unions; copyright and patent).	II d: V a	• Law, regulations and policies affecting land use and land ownership can have a major influence on the growth of human populations and communities. • Law, regulations and policies also directly affect the extraction, harvest, transportation, and consumption of natural resources as well as the management of the resulting byproducts.
3. Discuss the individual's legal obligations to obey the law, serve as a juror, and pay taxes.		
4. Understand the obligations of civic-mindedness, including voting, being informed on civic issues, volunteering and performing public service, and serving in the military or alternative service.	V b	• Individual citizens have opportunities to participate in decision-making about resources and natural systems as a part of civic life.

5. Describe the reciprocity between rights and obligations; that is, why enjoyment of one's rights entails respect for the rights of others.	V a	• Decisions made regarding natural resources and systems are based on a variety of factors. • Decisions related to natural systems and natural resources often result in the interaction between individual rights and liberties and choices related to the "common good."
6. Explain how one becomes a citizen of the United States, including the process of naturalization (e.g., literacy, language, and other requirements).		

3. Students evaluate and take and defend positions on what the fundamental values and principles of civil society are (i.e., the autonomous sphere of voluntary personal, social, and economic relations that are not part of government), their interdependence, and the meaning and importance of those values and principles for a free society.		
1. Explain how civil society provides opportunities for individuals to associate for social, cultural, religious, economic, and political purposes.		
2. Explain how civil society makes it possible for people, individually or in association with others, to bring their influence to bear on government in ways other than voting and elections.		
3. Discuss the historical role of religion and religious diversity.		
4. Compare the relationship of government and civil society in constitutional democracies to the relationship of government and civil society in authoritarian and totalitarian regimes.		

4. Students analyze the unique roles and responsibilities of the three branches of government as established by the U.S. Constitution.		
1. Discuss Article I of the Constitution as it relates to the legislative branch, including eligibility for office and lengths of terms of representatives and senators; election to office; the roles of the House and Senate in impeachment proceedings; the role of the vice president; the enumerated legislative powers; and the process by which a bill becomes a law.		
2. Explain the process through which the Constitution can be amended.		
3. Identify their current representatives in the legislative branch of the national government.		
4. Discuss Article II of the Constitution as it relates to the executive branch, including eligibility for office and length of term, election to and removal from office, the oath of office, and the enumerated executive powers.		
5. Discuss Article III of the Constitution as it relates to judicial power, including the length of terms of judges and the jurisdiction of the Supreme Court.		
6. Explain the processes of selection and confirmation of Supreme Court justices.		

5. Students summarize landmark U.S. Supreme Court interpretations of the Constitution and its amendments.		
1. Understand the changing interpretations of the Bill of Rights over time, including interpretations of the basic freedoms (religion, speech, press, petition, and assembly) articulated in the First Amendment and the due process and equal-protection-of-the-law clauses of the Fourteenth Amendment.		
2. Analyze judicial activism and judicial restraint and the effects of each policy over the decades (e.g., the Warren and Rehnquist courts).		
3. Evaluate the effects of the Court's interpretations of the Constitution in *Marbury* v. *Madison, McCulloch* v. *Maryland,* and *United States* v. *Nixon,* with emphasis on the arguments espoused by each side in these cases.		
4. Explain the controversies that have resulted over changing interpretations of civil rights, including those in *Plessy* v. *Ferguson, Brown* v. *Board of Education, Miranda* v. *Arizona, Regents of the University of California* v. *Bakke, Adarand Constructors, Inc.* v. *Pena,* and *United States* v. *Virginia* (VMI).		

6. Students evaluate issues regarding campaigns for national, state, and local elective offices.		
1. Analyze the origin, development, and role of political parties, noting those occasional periods in which there was only one major party or were more than two major parties.		
2. Discuss the history of the nomination process for presidential candidates and the increasing importance of primaries in general elections.		
3. Evaluate the roles of polls, campaign advertising, and the controversies over campaign funding.		
4. Describe the means that citizens use to participate in the political process (e.g., voting, campaigning, lobbying, filing a legal challenge, demonstrating, petitioning, picketing, running for political office).		
5. Discuss the features of direct democracy in numerous states (e.g., the process of referendums, recall elections).		
6. Analyze trends in voter turnout; the causes and effects of reapportionment and redistricting, with special attention to spatial districting and the rights of minorities; and the function of the Electoral College.		

7. Students analyze and compare the powers and procedures of the national, state, tribal, and local governments.		
1. Explain how conflicts between levels of government and branches of government are resolved.		

2. Identify the major responsibilities and sources of revenue for state and local governments.	I a b; II c d; III b c; IV a c; V a b	• Natural systems provide resources (goods and ecosystem services) and are a potential source of revenue for state and local governments (either directly or through taxation). • The expansion and operation of human communities (sometimes accomplished through governmental actions) and the laws, regulations, policies and incentives developed to govern the use and management of resources at the state and local level (that are enforced by agencies and departments in the government) have an effect on natural systems. • Decisions made regarding natural resources and systems are often the responsibility of state and local governments.
3. Discuss reserved powers and concurrent powers of state governments.		
4. Discuss the Ninth and Tenth Amendments and interpretations of the extent of the federal government's power.		
5. Explain how public policy is formed, including the setting of the public agenda and implementation of it through regulations and executive orders.	II d; V a b	• The laws, regulations, policies and incentives developed to govern the use and management of resources at the state and local level have an effect on natural systems. • Decisions made by state and local governments regarding natural resources and systems follow specific processes and are influenced by a variety of factors.
6. Compare the processes of lawmaking at each of the three levels of government, including the role of lobbying and the media.	V b	• The processes of making decisions about resources and natural systems, and the assessment of social, economic, political, and environmental factors vary at different levels of government.
7. Identify the organization and jurisdiction of federal, state, and local (e.g., California) courts and the interrelationships among them.		
8. Understand the scope of presidential power and decision-making through examination of case studies such as the Cuban Missile Crisis, passage of Great Society legislation, War Powers Act, Gulf War, and Bosnia.		

8. Students evaluate and take and defend positions on the influence of the media on American political life.		
1. Discuss the meaning and importance of a free and responsible press.		
2. Describe the roles of broadcast, print, and electronic media, including the Internet, as means of communication in American politics.		
3. Explain how public officials use the media to communicate with the citizenry and to shape public opinion.		

9. Students analyze the origins, characteristics, and development of different political systems across time, with emphasis on the quest for political democracy, its advances, and its obstacles.		
1. Explain how the different philosophies and structures of feudalism, mercantilism, socialism, fascism, communism, monarchies, parliamentary systems, and constitutional liberal democracies influence economic policies, social welfare policies, and human rights practices.	II d; V b	• Decisions regarding natural resources and systems were made through different processes under feudalism, mercantilism, socialism, fascism, communism, monarchies, parliamentary systems, and constitutional liberal democracies. • These different philosophies and political structures resulted in the development of a wide range of laws, regulations, policies, and incentives that govern management and consumption of natural resources. • These different philosophies and political structures, and the laws, regulations, policies, and incentives that came from them have had a lasting and cumulative effect on natural systems.
2. Compare the various ways in which power is distributed, shared, and limited in systems of shared powers and in parliamentary systems, including the influence and role of parliamentary leaders (e.g., William Gladstone, Margaret Thatcher).		

3. Discuss the advantages and disadvantages of federal, confederal, and unitary systems of government.		
4. Describe for at least two countries the consequences of conditions that gave rise to tyrannies during certain periods (e.g., Italy, Japan, Haiti, Nigeria, Cambodia).		
5. Identify the forms of illegitimate power that twentieth-century African, Asian, and Latin American dictators used to gain and hold office and the conditions and interests that supported them.		
6. Identify the ideologies, causes, stages, and outcomes of major Mexican, Central American, and South American revolutions in the nineteenth and twentieth centuries		
7. Describe the ideologies that give rise to Communism, methods of maintaining control, and the movements to overthrow such governments in Czechoslovakia, Hungary, and Poland, including the roles of individuals (e.g., Alexander Solzhenitsyn, Pope John Paul II, Lech Walesa, Vaclav Havel).		
8. Identify the successes of relatively new democracies in Africa, Asia, and Latin America and the ideas, leaders, and general societal conditions that have launched and sustained, or failed to sustain, them.		

10. Students formulate questions about and defend their analyses of tensions within our constitutional democracy and the importance of maintaining a balance between the following concepts: majority rule and individual rights; liberty and equality; state and national authority in a federal system; civil disobedience and the rule of law; freedom of the press and the right to a fair trial; the relationship of religion and government.		
	II d; V a b	• Tensions within our constitutional democracy can be illustrated by way of environmental case studies that serve as a context for analyzing majority rule and individual rights; liberty and equality; state and national authority in a federal system; civil disobedience and the rule of law; freedom of the press; the right to a fair trial; and, the relationship of religion and government.

Principles of Economics		
1. Students understand common economic terms and concepts and economic reasoning.		
1. Examine the causal relationship between scarcity and the need for choices.	I a b c; V a	• Natural systems and physical geography provide resources (goods and ecosystem services) upon which humans rely. • If those systems are not healthy, they fail to produce the expected quantity and quality of resources and that productivity may be less reliable. • Decisions regarding natural resources and systems (the need for choices) are based on many factors including economics and environmental justice.
2. Explain opportunity cost and marginal benefit and marginal cost.	V a b	• Decisions regarding natural resources and systems may be based on opportunity or marginal costs, and marginal benefits (which is both an influence and a process). • When decisions regarding natural systems and resources are made with insufficient information they may result in unexpected long-term costs.

3. Identify the difference between monetary and non-monetary incentives and how changes in incentives cause changes in behavior.	II d; V a	• The incentives developed to govern the use and management of resources affect natural systems. • Frequently incentive systems related to natural systems and resources do not adequately account for the full spectrum of costs associated with the extraction, harvest, transportation, and consumption of natural resources or management of the resulting byproducts. • Incentives are often used to "control" decisions regarding the extraction, harvest, transportation, and consumption of natural resources or management of the resulting byproducts.
4. Evaluate the role of private property as an incentive in conserving and improving scarce resources, including renewable and nonrenewable natural resources.	I a b c; II a b c d; V a	• Property ownership and the regulation of land use practices are often used as incentives to govern the use and management of natural systems and resources. • These incentives may have beneficial, neutral or detrimental effects on natural systems and resources. • The use of private property as an incentive for conserving natural resources varies widely depending on the specific types of resources available (e.g., coal, timber, oil).
5. Analyze the role of a market economy in establishing and preserving political and personal liberty (e.g., through the works of Adam Smith).		

2. Students analyze the elements of America's market economy in a global setting.		
1. Understand the relationship of the concept of incentives to the law of supply and the relationship of the concept of incentives and substitutes to the law of demand.		
2. Discuss the effects of changes in supply and/or demand on the relative scarcity, price, and quantity of particular products.	1a b c; II a b c d; V a	• The relative scarcity and price of the goods and ecosystem services provided by natural systems and physical geography influence the availability of these resources upon which humans rely. • The health of the natural systems can directly affect both the quantity and quality of the goods and services that they provide thus, directly affecting the scarcity and price of those goods. • As populations and communities grow, changes occur in the size, composition, and operation of these communities, methods used to extract and consume natural resources, and consumption rates. • These changes, as well as the laws, policies, and incentives developed to regulate natural resource use and management had effects on the surrounding natural systems. • Decisions regarding natural systems and resources are based on many factors including the relative scarcity and price of the goods and ecosystem services provided by those systems.
3. Explain the roles of property rights, competition, and profit in a market economy.		
4. Explain how prices reflect the relative scarcity of goods and services and perform the allocative function in a market economy.		
5. Understand the process by which competition among buyers and sellers determines a market price.		
6. Describe the effect of price controls on buyers and sellers.		
7. Analyze how domestic and international competition in a market economy affects goods and services produced and the quality, quantity, and price of those products.	I a b c; II a b; V a b	• Many of the goods and ecosystem services in international markets are provided by the natural systems located in the exporting and/or importing countries. • The health of those natural systems directly affects the quality, quantity, and price of those goods thus, directly affecting the scarcity and price of those goods. • The growth of populations and communities in other countries, as well as different systems of laws, regulations, policies and incentives related to natural systems influences the geographic extent, composition, biological diversity, and viability of the natural systems in those nations.

8. Explain the role of profit as the incentive to entrepreneurs in a market economy.		
9. Describe the functions of the financial markets.		
10. Discuss the economic principles that guide the location of agricultural production and industry and the spatial distribution of transportation and retail facilities.	I c	• The location of agricultural production is directly associated with the health and characteristics of the natural systems that are present in any given location (e.g., soil, water resources).

3. Students analyze the influence of the federal government on the American economy.		
1. Understand how the role of government in a market economy often includes providing for national defense, addressing environmental concerns, defining and enforcing property rights, attempting to make markets more competitive, and protecting consumers' rights.	I a b; II d; IV a; V a	• The dependence of humans on natural systems and the goods and ecosystem services they provide encourages governments to develop laws, regulations, policies and incentives to control the use and management of those systems. • Laws, regulations, policies and incentives are also used to control the quantity of resources consumed and the quantity and characteristics of byproducts that result from the production and consumption of natural resources. • Decisions regarding natural resources and systems are based on many factors including environmental and economic concerns.
2. Identify the factors that may cause the costs of government actions to outweigh the benefits.		
3. Describe the aims of government fiscal policies (taxation, borrowing, spending) and their influence on production, employment, and price levels.		
4. Understand the aims and tools of monetary policy and their influence on economic activity (e.g., the Federal Reserve).		

4. Students analyze the elements of the U.S. labor market in a global setting.		
1. Understand the operations of the labor market, including the circumstances surrounding the establishment of principal American labor unions, procedures that unions use to gain benefits for their members, the effects of unionization, the mini-mum wage, and unemployment insurance.		
2. Describe the current economy and labor market, including the types of goods and services produced, the types of skills workers need, the effects of rapid technological change, and the impact of international competition.		
3. Discuss wage differences among jobs and professions, using the laws of demand and supply and the concept of productivity.		
4. Explain the effects of international mobility of capital and labor on the U.S. economy.		

5. Students analyze the aggregate economic behavior of the U.S. economy.		
1. Distinguish between nominal and real data.		
2. Define, calculate, and explain the significance of an unemployment rate, the number of new jobs created monthly, an inflation or deflation rate, and a rate of economic growth.		
3. Distinguish between short-term and long-term interest rates and explain their relative significance.		

6. Students analyze issues of international trade and explain how the U.S. economy affects, and is affected by, economic forces beyond the United States' borders.		
1. Identify the gains in consumption and production efficiency from trade, with emphasis on the main products and changing geographic patterns of twentieth-century trade among countries in the Western Hemisphere.		
2. Compare the reasons for and the effects of trade restrictions during the Great Depression compared with present-day arguments among labor, business, and political leaders over the effects of free trade on the economic and social interests of various groups of Americans.		
3. Understand the changing role of international political borders and territorial sovereignty in a global economy.		
4. Explain foreign exchange, the manner in which exchange rates are determined, and the effects of the dollar's gaining (or losing) value relative to other currencies.		